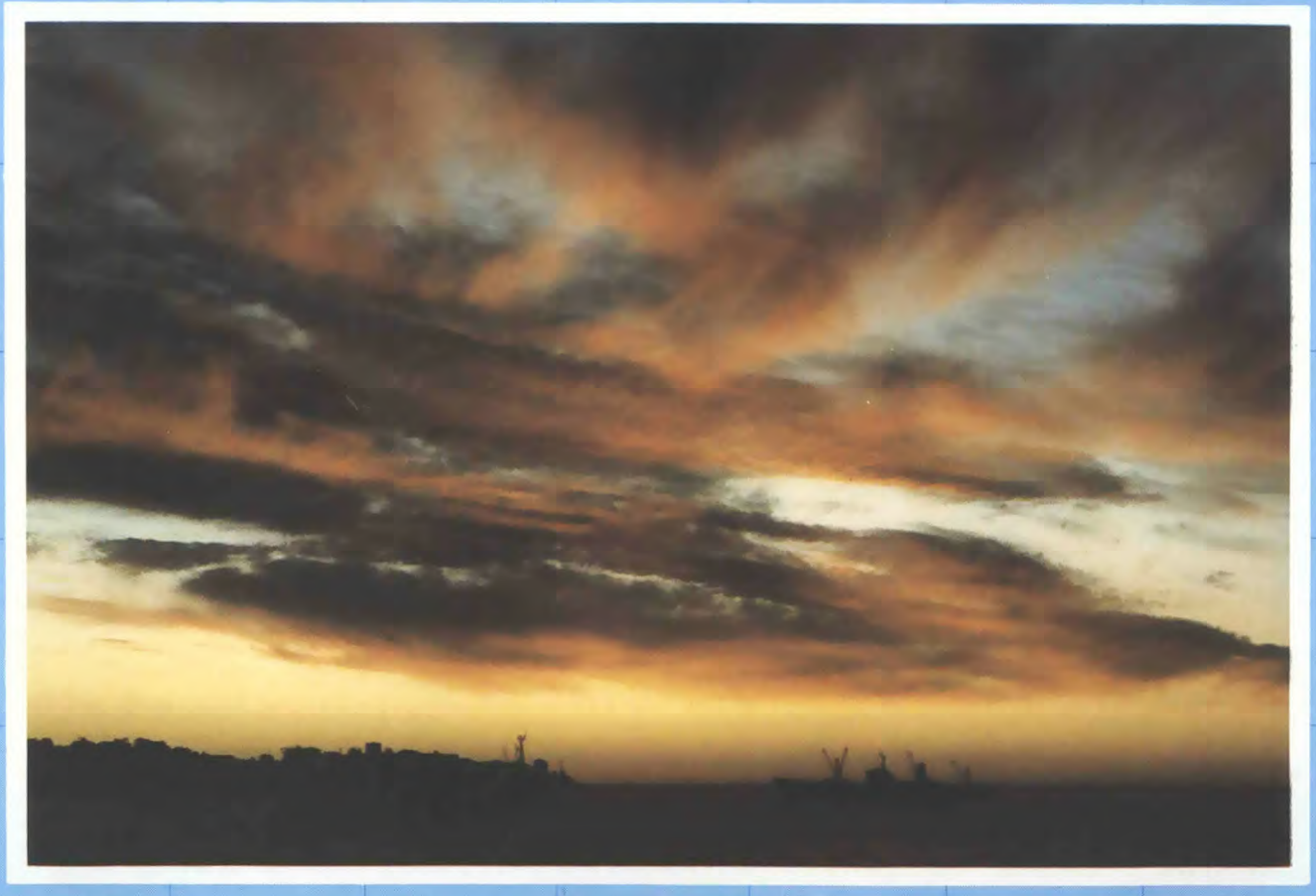
Met.O.975

The Marine Observer

A quarterly journal of Maritime Meteorology



Volume 57 No. 295
January 1987

THE MARINE OBSERVER

A Quarterly Journal of Maritime Meteorology
prepared by the Marine Division of the
Meteorological Office

Vol. 57

1987

Met. O. 975

THE MARINE OBSERVER

A QUARTERLY JOURNAL OF MARITIME METEOROLOGY PREPARED BY THE MARINE DIVISION OF THE METEOROLOGICAL OFFICE

VOL. 57 No. 295 JANUARY 1987

CONTENTS

	Page
Editorial	4
The Marine Observers' Log — January, February, March	7
Weather Forecasting: Magic, Art, Science and Hypnosis. By Dr R. Motte	27
Ship Damage and Loss, A Case for weather routeing of ships. By A.A. Neale	31
Aurora Notes January to March. By R.J. Livesey	34
Letters to the Editor	37
Personalities	38
Book Reviews	
Ocean Ships	39
JANET: The Restoration of a Victorian Yacht	39
Aurora, The Northern Lights in Mythology, History and Science	40
Storm	41
Notice to Marine Observers	41
Fleet Lists	42

COVER PHOTOGRAPH taken from m.v. *Carinthia*, by Mr R.G. Armstrong, 3rd Officer, during the early evening of 9 April 1985 at Valparaiso, Chile.

Letters to the Editor, and books for review, should be sent to the Editor, The Marine Observer, Meteorological Office, Eastern Road, Bracknell, Berkshire RG12 2UR

HER MAJESTY'S STATIONERY OFFICE

Editorial

When HM The Queen sailed up the River Clyde on board the Royal Yacht *Britannia* in August 1986, OWS *Cumulus* was at her riverside berth in Greenock, as smart as her annual dry-docking/maintenance could make her, dressed overall to salute the Sovereign. (*See* photograph opposite page 13.) Her Majesty was *en route* to Rothesay Dock up-river to perform a hi-tech naming ceremony of an oil rig in Greenock, twenty miles down-river. OWS *Cumulus* had just completed her annual dry-docking and maintenance in Greenock over a nine-day period, her longest spell in port since taking over single-manning of Station 'Lima' in February. Her normal 33-day voyage cycle allows 27 days on station, four days on passage and only two days in port to restore and change crew.

The return of the 'weather ship' to the Clyde in February 1986, after a gap of four years when the chartered vessel *Starella* was operated from Fleetwood, occasioned a great deal of media and public interest in the area, with a general feeling that at last the weather ship was back where she belonged. Perhaps there was also some pride in a good bargain, for *Cumulus* was bought for a token £1 payment from the Royal Netherlands Meteorological Institute who no longer wished to be involved in manning an Ocean Weather Station. Regrettably the Netherlands will eventually insist on repurchasing *Cumulus* for that same token £1 payment! Meanwhile the Met. Office is extremely proud of this fine, purpose-built weather ship, which is being managed by J. Marr & Son Ltd of Hull (the owners of *Starella*). OWS *Cumulus* has a crew of 20, seven of whom are Met. Office personnel, and the manning arrangements are such that each crew member, Met. or ship's staff, have to do an occasional double voyage. The entire operation has proved to be a most cost-effective method of obtaining comprehensive and almost continuous weather ship data.

The supply and installation of the MOSS (Meteorological Observing System for Ships) units to ships has continued and those of you who have been shipmates with these 'black boxes' will agree that their user-friendliness has been most popular. The forecasters' unending quest for more surface data is well met by those ships with MOSS on board as all observations made can be transmitted in real time. It is our intention to steadily increase the supply of MOSS units to ships of the VOF.

The provision of upper air data from merchant ships, ASAP (Automated Shipboard Aerological Programme), took a step forward when the U.K. VOF ship *Canmar Ambassador* was equipped with an ASAP container at Felixstowe in September. This container is owned and operated by the Finnish Meteorological Institute and will provide a regular flow of upper air information during the vessel's passages from the U.K. to Canada. The fitting of the Finnish Met. Service's unit in a British ship demonstrates the truly international nature of marine meteorology. During 1987 the Meteorological Office plans to install ASAP units on board two U.K. vessels engaged on transatlantic passages.

Most of the readers of this journal will have read about the lengthy deliberations which have taken place in the various committees of the International Maritime Organization (IMO) regarding the Future Global Maritime Distress and Safety System (FGMDSS), and the important part which INMARSAT will possibly play in FGMDSS. As the WMO Observer to IMO, I have attended many meetings when the maritime communication system of the 1990's has been discussed. Not unnaturally I have listened to the arguments for

and against the new technology, each participant displaying, with eloquent ease, his reasons for promoting his delegation's particular point of view. It is, however, clear that a new era in maritime communications is dawning and, in one way or another, it will affect us all.

During March of this year a sea trial will be mounted to test the Enhanced Group Call (EGC) facility of the INMARSAT system when about 20 ships of various nations and types will be equipped with a special Ship Earth Station (SES) to receive EGC broadcasts when sailing within the footprint of the Atlantic Ocean Region satellite. The WMO is participating in this trial as one of the suppliers of data through their member nations U.K., U.S.A., Canada, Norway and France, providing storm warnings and routine shipping bulletins to the Coast Earth Stations (CES's) for broadcast to the participating ships who will receive the data in an unattended, direct printing mode — a deep sea NAVTEX, but using satcoms rather than terrestrial radio paths. Other data supliers in this trial will be the NAV WARNING service of the International Hydrographic Organisation and the Search and Rescue Authorities. The operational aspect of the sea trial will be for a four week period and co-operating ships will be requested to report on the quality and timeliness of the data reception. Clearly this trial is a forerunner to what may well be the norm in maritime telecommunications in the next decade and those of us in the marine meteorological community wish to ensure that the mariner will benefit from the new technology, and is not deprived of the advantages of speedy and accurate receipt of meteorological warnings and forecasts which the EGC system can offer. The results of the EGC Sea Trial will be awaited with much interest by the international shipping community, and if the EGC system is adopted by IMO as part of the carriage requirements for the FGMDSS then we shall all witness changes.

The traditional marine forecast areas for instance, may have to change their shapes and names — we may have to consider rationalisation of the present areas which exist to accommodate the practices of the various international marine meteorological transmissions. We all live in an era of change — some may say too-rapid change — but those who resist change are all too often left well astern.

I hope to publish the results of the EGC Sea Trial in this journal when all the data have been analysed; in the meantime if you have any views or suggestions on the subject of marine forecast areas (and of course any other marine 'met.' matters) please do not forget our 'Letters to the Editor' section. *The Marine Observer* is your journal and I would like to hear from you.

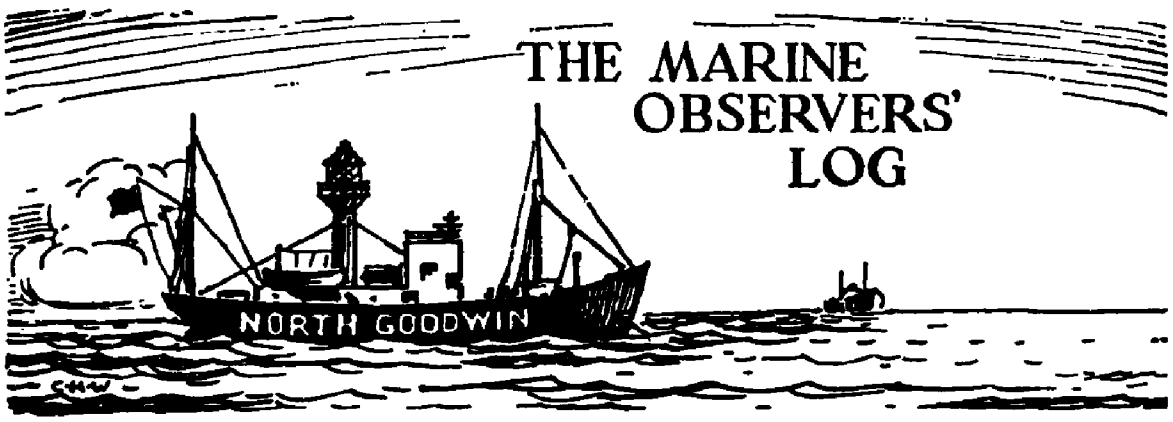
Voluntary observers sailing aboard ships of all countries have, during 1986, done an admirable job. By their efforts they have provided each day a large portion of the synoptic weather picture of the world, whereby meteorologists of all nations have been enabled to issue weather bulletins and forecasts, not only for the benefit of shipping and aircraft, but for agriculture, industry and, in fact, for all human activities. It is not only the day-to-day forecasting that is affected; there is that important matter of research and climatology which is an essential towards our better understanding of the vagaries of the weather. Marine meteorology and in particular the observations from the Voluntary Observing Fleet continue to play a very important part in the world meteorological scene. Let no one be mislead into believing tales that in these days of satellites the need for the ships' OBS has diminished. Nothing would be farther from fact — the new technologies of satellites, and meteorological buoys, has increased the need for

surface data from observing ships not only to feed the larger and ever hungry met. computers but also to inter-compare the data with the satellites and buoys. This year sees the start of a very exciting new concept in meteorology and the VOF forms an important part of this new project. OWSE–NA is (yet another!) acronym, and means Operational World Weather Watch Systems Evaluation–North Atlantic. Briefly, it is an evaluation both scientific and operational, of the various WMO data gathering systems deployed on and above the North Atlantic. These systems comprise the weather ships, the Voluntary Observing fleets of all nations whose ships ply the Atlantic, the ASAP ships, fixed and drifting meteorological buoys, satellites and ASDAR (the ASAP of the commercial airlines) — selected aircraft which drop radio-sondes whilst in flight across the ocean. A very comprehensive programme of data gathering, monitoring and evaluation will be an essential part of OWSE–NA and it is recognised by meteorologists the world over that your meteorological report (sent in real time, please!) will play a central role in this project. A goal for 1987 gentlemen (and ladies): 'Do the weather report and get it away on time'.

Marine meteorology is a truely international venture and not only do your observations provide the data necessary to assist Bracknell forecasters to issue storm/gale warnings and routine shipping bulletins, but your reports are relayed to other meteorological centres whose marine forecasters undertake similar tasks to their U.K. colleagues. As we all know, the storm at sea is no respecter of national flags, and your report may be the one which can help the forecaster to pinpoint the low and thus enable him to issue a warning which can be to the benefit (and saviour) of you and your foreign flag colleague.

It therefore gives me great pleasure at the beginning of this New Year to thank all those at sea who have always given of their best and wish you all continuous and safe sailing, good landfalls and every success in 1987.

G.V.M.



January, February, March

The Marine Observers' Log is a quarterly selection of observations of interest and value. The observations are derived from the logbooks of marine observers and from individual manuscripts. Responsibility for each observation rests with the contributor.

Observing officers are reminded that preserved samples of discoloured water, luminescent water, etc. considerably enhance the value of such an observation. Port Meteorological Officers in the U.K. will supply instructions on how to preserve and pack such samples on request.

HEAVY WEATHER

Sea of Marmara

m.v. *Santos Star*. Captain E.W. Wells. At Istanbul anchorage. Observers: the Master, Mr U. Bhandarkar, 3rd Officer and ship's company.

17 January 1986. The vessel had been at anchor for a day to carry out repairs in the engine room in what one might term as 'perfect weather conditions' i.e., rippled sea, no swell, mainly cloudy with moderate visibility. Pressure was falling steadily and there were no storm warnings.

Conditions then began to deteriorate and the following observations were taken.

0600 GMT:	Slight drizzle, not affecting the visibility very much.
0630:	Vessel started yawing slightly to a very low SW'ly swell. As there were many ships in the vicinity, a careful radar watch was maintained.
0700:	The wind slowly started to freshen up and the vessel's yaw gradually increased. Its position was ascertained at more frequent intervals. There was a SW'ly wind, force 3–4, moderate swell, overcast sky and continuous light drizzle. The Master was informed, and instructed the Officer on Watch to summon him if the conditions deteriorated any further.
0720:	A sudden gust of wind and the ship started to roll/yaw quite heavily. The Master was summoned, who ordered the engines to be kept on immediate notice. The wind was now SW'ly, force 6, heavy swell, overcast sky and continuous light drizzle persisting.
0730:	Wind further increased and drizzle began impairing vision. Within a few minutes, the conditions had deteriorated, causing concern. The Master kept the Chief Officer and Bosun on standby. Wind SW'ly, force 8. Rough seas and heavy swell. Vessel rolling/yawing very heavily. Overcast, heavy drizzle, visibility very poor — about 25 m. Vessel relying on radar for ascertaining position.

0745: The vessel suddenly lurched and started dragging the anchor so quickly that she covered 2 cables in two minutes. The engines were started immediately, and fortunately the Chief Officer who was on standby forward, commenced heaving on the cable. This action, along with the use of the engines, prevented us from making contact with a ship astern of us. We continued dragging anchor, being helpless as we were in a very congested anchorage area, and constantly had to manoeuvre to take the weight off the cable, keep the ship's head into the sea and swell, and most important of all, avoid making contact with other vessels in the vicinity. By now, there was utter chaos prevailing, and on listening to the VHF channel, it was quite clear that a few other ships were having the same problem. At this time, very strong, gusty winds of force 8 prevailed, there was a heavy swell, overcast sky with heavy drizzle and very poor visibility.

0800: By now, the vessel had drifted clear of the anchorage area to the mouth of the Bosporous channel. With short bursts of the engine, while simultaneously heaving the anchor, the vessel maintained its position.

0823: Anchor aweigh, and at 0825, the vessel was proceeding to open waters.

0900: Vessel drifting in safe waters. The wind had decreased slightly, but the vessel continued to pitch and roll heavily since a heavy swell was present. The intensity of the drizzle had also decreased and visibility was improved to 'moderate'.

1000: Wind veered to W'ly, force 5–6. Heavy SW'ly swell. Overcast, continuous light drizzle. Visibility moderate. Pressure 990 mb.

1030: The wind had eased considerably, swell moderate, visibility improving.

1045: All seemed nice and quiet except for the persistent light drizzle, so it was decided to head back to the anchorage.

1100: Vessel anchored once again.

It was a very hair-raising experience for most of us, and it was only through quick and decisive action that a disaster was avoided.

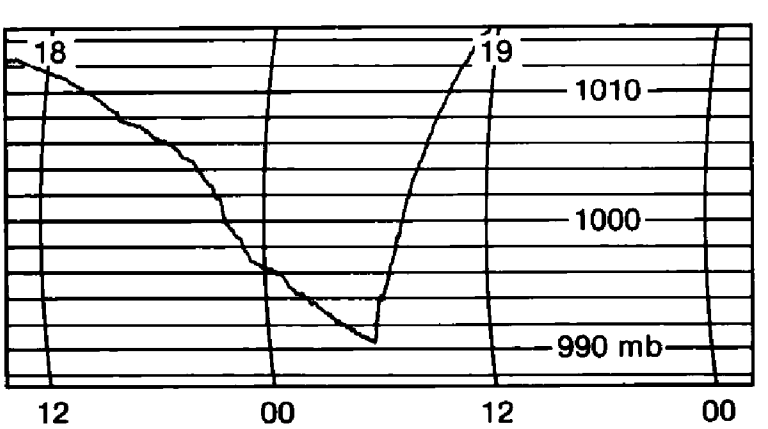
Position of ship: 40° 59'N, 28° 57'E.

PASSAGE OF FRONT

North Atlantic Ocean

m.v. *Cast Husky*. Captain E. Williams. Antwerp to Montreal. Observer: Mr W.A.C. Gill, 3rd Officer.

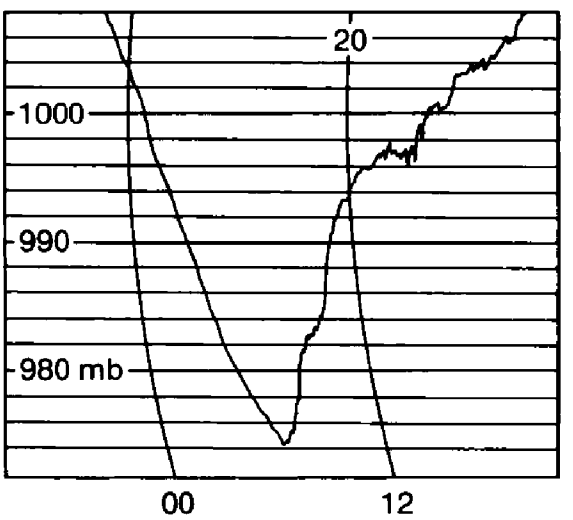
19 March 1986. On inspection of the 3-cm radar PPI at about 0430 GMT, a solid rain line was observed just appearing on the 24-n. mile range. The line was monitored and was found to be bearing 020°/200°; 42 n. mile of it was observable on the PPI. It took thirty minutes to reach and pass over the vessel at an estimated speed of 48 knots, but the ship's speed by log (usually very accurate) was 8 knots, thus giving an actual speed for the front of about 40 knots.



Weather conditions before the passage were: air temperature 13.0 °C, wet bulb 12.5, dew point 11.1, pressure 991.9 mb falling steadily, wind SW'S'ly, force 8. There were also showers, and as the front passed, heavy rain was experienced and the wind veered rapidly while increasing slightly. After the front, the air temperature was 9.5, wet bulb 9.0, dew point 8.4, pressure 993.3 mb, wind NW'W'ly, force 8. The barograph trace showed a sharp jump, and pressure continued to rise rapidly; the rain eased, but remained moderate and continuous until the next synoptic hour. The wind increased to force 10.

Position of ship: 47° 15'N, 33° 18'W.

Note. The cold front experienced by the *Cast Husky* was associated with a depression (998 mb) which first appeared near 40° N, 50° W at 0600 on the 18th. It tracked north-east, deepening all the time, and deepened rapidly from 1200 on the 19th to be near 52° N, 8° W (970 mb) at 0600 on the 20th.



The ferry *Isle of Arran*, 55° 36'N, 05° 06'W, encountered the same depression at 0700 on the 20th, and her barogram (above) shows its further development. Constant winds of 70–75 knots were noted, with gusts to 100 knots.

DEPRESSION

Bristol Channel

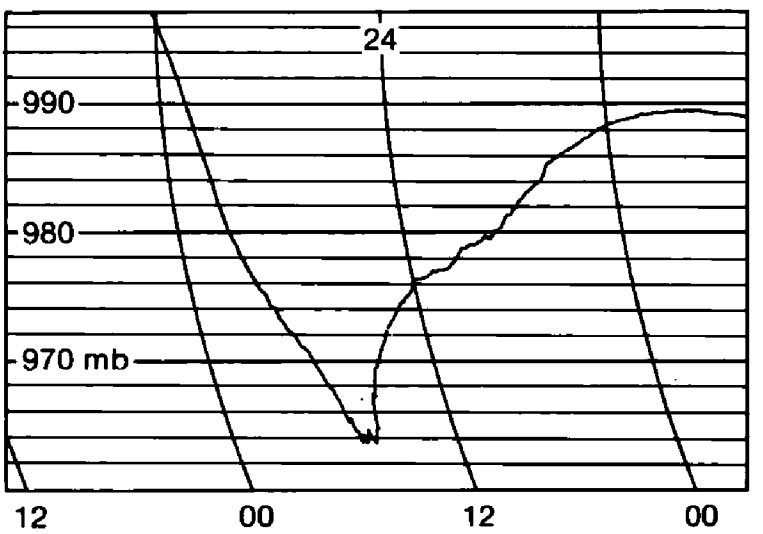
m.v. *British Test*. Captain H. Brown. At anchor, Swansea. Observers: the Master, Mr J.W. Gough, 2nd Officer and ship's company.

21–24 March 1986. The ship arrived off Swansea on the 21st and anchored with the port anchor, seven shackles in the water, to await a berth. The wind was SW'ly, force 4, whilst the pressure was 1026 mb.

On the 23rd, the weather forecast at midday indicated a fast-moving depression 900 n. mile west of Brest, expected in sea area Humber twenty-four hours later. During the 8–12 watch that night, the pressure started to fall and continued to fall sharply during the 12–4; the wind increased in strength although still from a generally SW'ly direction. By 0400 GMT there were four other ships in the anchorage.

At about 0600 on the 24th, it was noticed that one of the other ships was dragging its anchor and soon two more were doing likewise. High water had occurred at 0500, and so the situation was that we had winds of SW'ly, force 10, but the ebb tide from the north-east. Pressure at this time was 972.0 mb.

We stayed comfortably to the wind and sea until 0700 when we started to ship seas on the forecastle, and a ship half a mile away started dragging past us. The Master then decided to weigh anchor and steam into the wind because any further delay would have endangered people working on the forecastle. By 0740 we had the anchor aweigh and were proceeding out of the anchorage; for the rest of the morning we steamed westwards. The wind at 0800 was SW'ly, force 12, and the pressure was 969.0 mb; the minimum pressure of about 963.0 mb occurred around 0830, see barogram.



At 1200, the wind was W'ly, force 7–8 and the ship then steamed eastwards, taking on a Swansea Pilot at 1610; we then proceeded into the docks to berth, and observations ceased.

As a result of the weather at the anchorage, the port anchor shank was badly bent and had to be landed for repair. The anchor type was Admiralty (AC14) Patent Anchor of High Holding Power design, weight 5 tons, and the shank was approximately 15 cm square steel.

Position of ship: 51° 29'N, 03° 10'W.

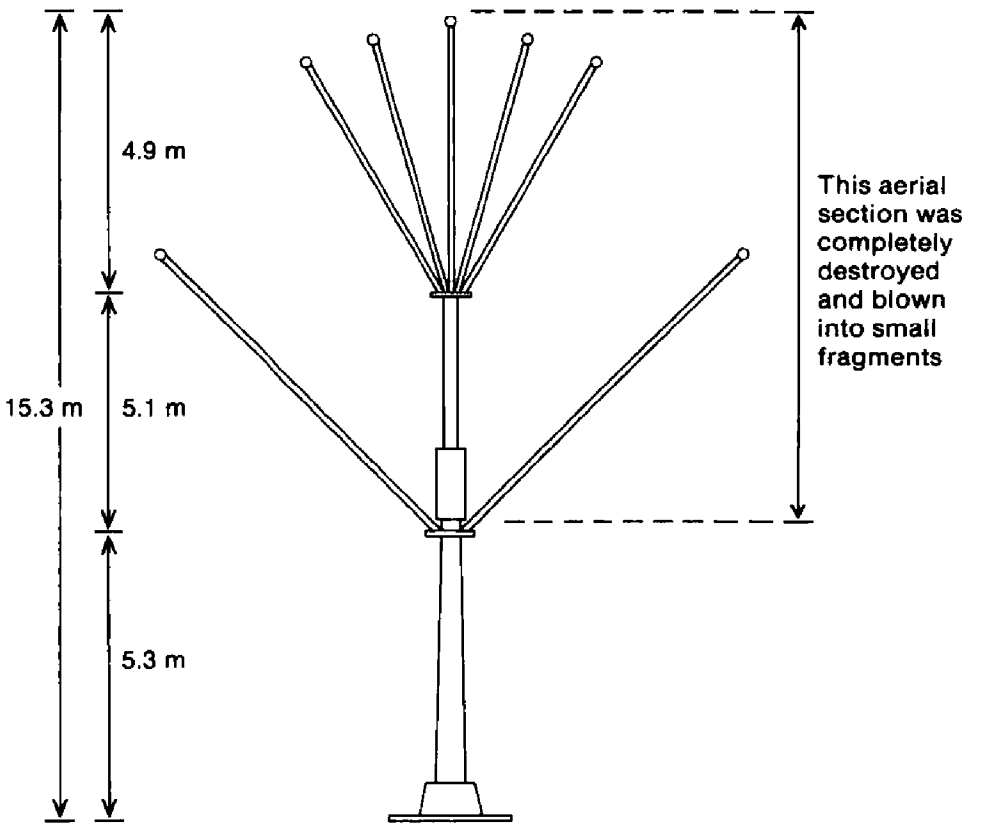
LIGHTNING

Equatorial Eastern Atlantic

m.v. *Pacific Universal.* Captain M.I. Turner. Cape Town to Hamburg. Observers: the Master, Mr A. Hardman, 1st Officer, Mr J. Piggott, 2nd Officer, Mr I. Simpson, 3rd Officer, Mr H. Roberts, Radio Officer and ship's company.

20 March 1986. At 2020 GMT, the emergency transmitting whip aerial of fibreglass sections was struck by lightning. The strike broke the aerial off about

6–7 m above the deck, at the metal joint where the smaller side aerials are fitted. Pieces of fibreglass were strewn over a large area, and the top portion of the aerial was found on the port bridge wing. The sketch shows the damage sustained.



The noise was deafening, being heard in all parts of the ship, and the Radio Officer, in the radio room at the time, was deafened and shocked. Smoke filled the room itself, although no fire was found, and no other damage to the vessel was observed.

At the time of the incident, the weather was very heavily overcast with continuous rain and thunderstorm; there was intense lightning in close proximity to the ship, and the radar indicated that heavy cloud and rainstorms extended to about 48 n. mile in all directions from the ship. The wind was variable, force 2.

Position of ship: 01° 26′N, 10° 29′W.

Note. Mr K. Grant, Meteorological Office, Special Investigations, comments:

'I don't think we can say very much about the meteorology of the event, except that the ship was close to the normal position of the Inter-tropical Convergence Zone, and that thunderstorms are expected on about 10 days in March at 01° 30′N, 10° 30′W. This value is high, but 15 days with thunder are expected a little way to the north-east.'

ARCTIC SEA SMOKE

North Atlantic Ocean

m.v. *Reynolds*. Captain S.F. Williams. Norfolk Va. to Safi. Observers: the Master, Mr D.S. Hibberd, 3rd Officer and members of the ship's company.

14–16 January 1986. When the vessel left Norfolk on the morning of the 14th, there was a deep depression situated over southern Nova Scotia some 750 n. mile to the east-north-east. At 0700 GMT, the weather was cold (dry bulb −0.5 °C), but not too unpleasant; the wind was WNW'ly, force 3 and the sky was cloudy with good visibility. By 1400 the wind had backed slightly to W'ly but remained at force 3, visibility was still good. Between 1540 and 1600, light snow reduced the visibility to about 4 n. mile, the seas remained slight.

At 1625, with the vessel now in the warm Gulf Stream, the sea-water temperature was 17.5 and dry bulb 3.1, the visibility reduced rapidly in sea smoke to 1 n. mile, and the fog presented an eerie atmosphere for those on the bridge. The situation was made worse by occasional moderate snow flurries.

By 1900 the wind had veered to NW'ly, force 5–6 and the ship was rolling moderately to quarterly seas and a moderate N'ly swell. The sea smoke was persisting, sea-water temperature was 17.2 and the dry bulb was 2.8.

Overnight, the situation became rapidly worse, with the wind NW'ly, gusting to force 8 and the snow flurries becoming much heavier.

By 0300 on the 15th, the ship was pitching and rolling heavily at times to very rough seas and a heavy swell. She was shipping heavy seas along the port side of the foredeck and taking spray overall. The dry-bulb temperature was now 0.2, and the sea 14.4, whilst the visibility was less than 0.5 n. mile in the sea smoke. Light snow had been falling more or less persistently for the last two hours. The photograph opposite page 12 was taken during the morning of the 15th.

During the forenoon watch, the ship's motion grew worse with heavy rolling in the now very rough, confused seas.

At 0730 the dry bulb temperature had fallen to −1.0, and at 1300 the wind backed to W'ly, force 6, the ship's movement was still very unpleasant.

The forecast received at 1730 predicted that the depression, which had moved to the east of Newfoundland and had been causing our northerlies earlier in the day, would now track in a SE'ly direction. Because of this, it was decided not to continue on our Great Circle course, and from position 38° 41′N, 65° 25′W, we altered course to run on the parallel to the Azores. The alteration immediately eased the ship's motion.

The sea smoke remained with us until about 1700 when it became patchy, although there was still a considerable difference between air and sea temperatures. It was not until 0800 the following day, the 16th, that we cleared the fog and the visibility improved to an estimated 10 n. mile.

Position of ship at 0700 GMT on the 14th: 36° 48′N, 75° 02′W.

North Atlantic Ocean

m.v. *Sekondi*. Captain E.J. Watterson. Nordenham to Contrecoeur. Observers: the Master, Mr G. Laversuch, 3rd Officer and Mr J. Nolan, Radio Officer.

15 February 1986. At 1436 GMT, the vessel passed under a large cumulus cloud and entered a heavy snow shower which reduced visibility to about 100 m.

Opposite page 12

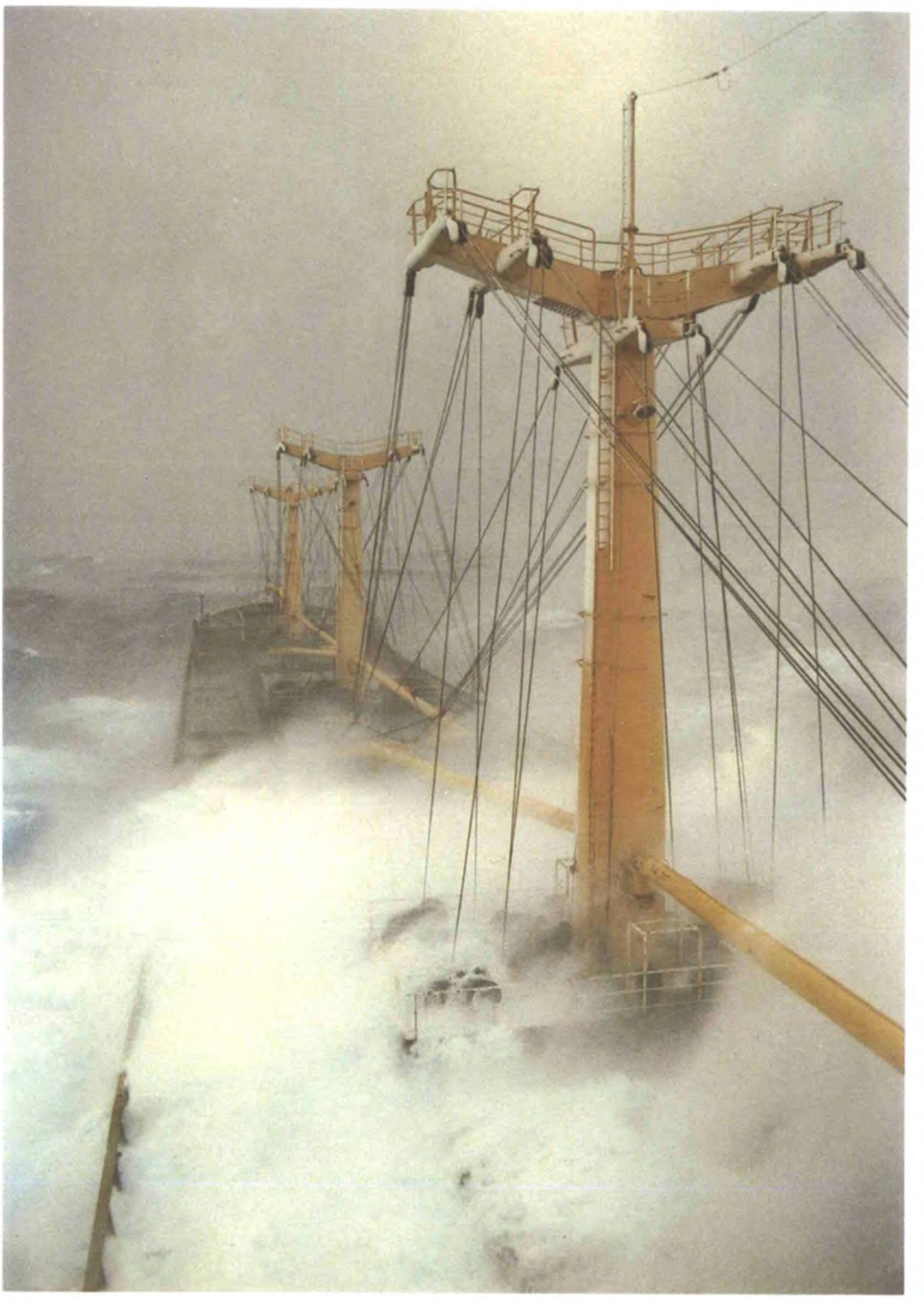


Photo. by D.S. Hibberd

m.v. Reynolds in sea smoke and heavy seas. (*See* page 12.)

Opposite page 13

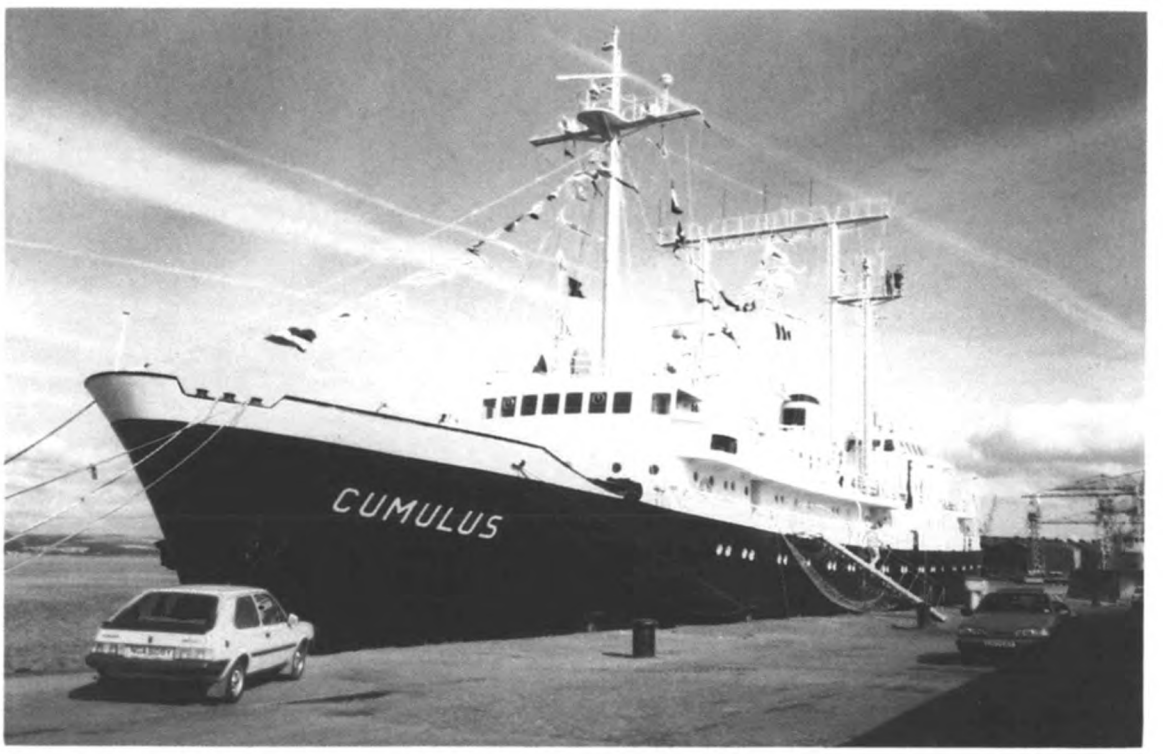


Photo. by Captain G.V. Mackie

OWS *Cumulus* after dry-docking and dressed over all. (*See* page 4.)

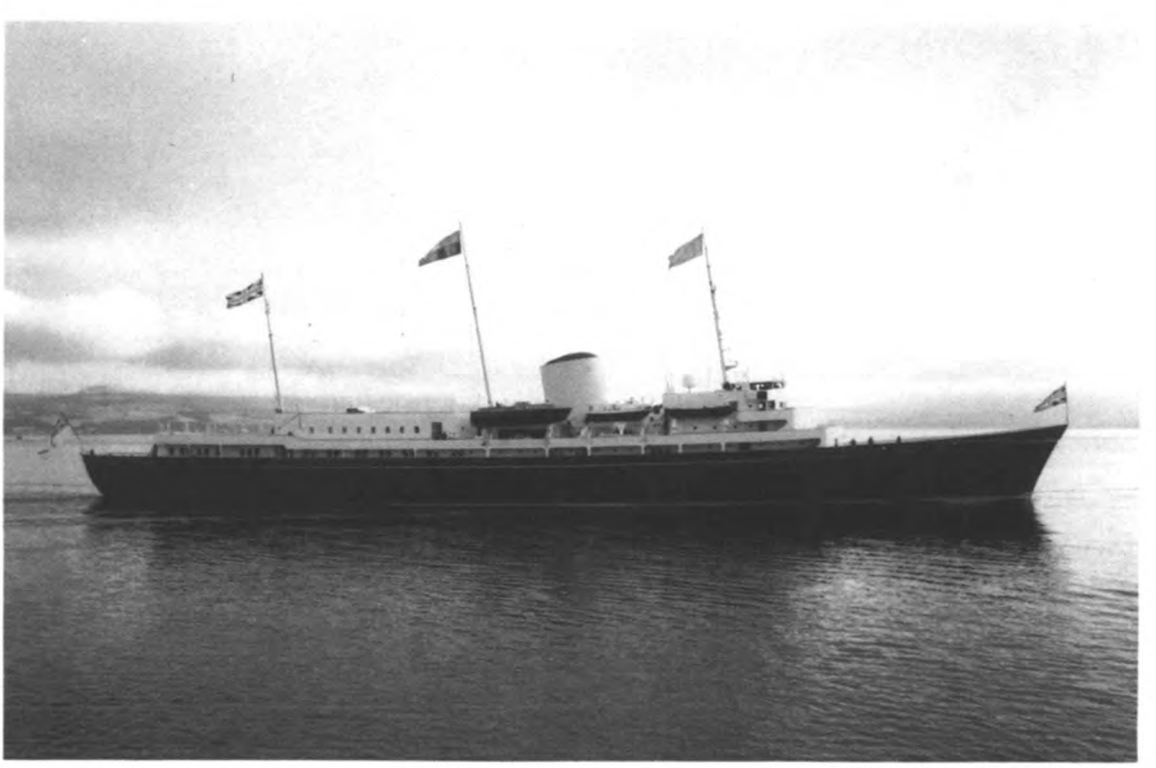


Photo. by Captain G.V. Mackie

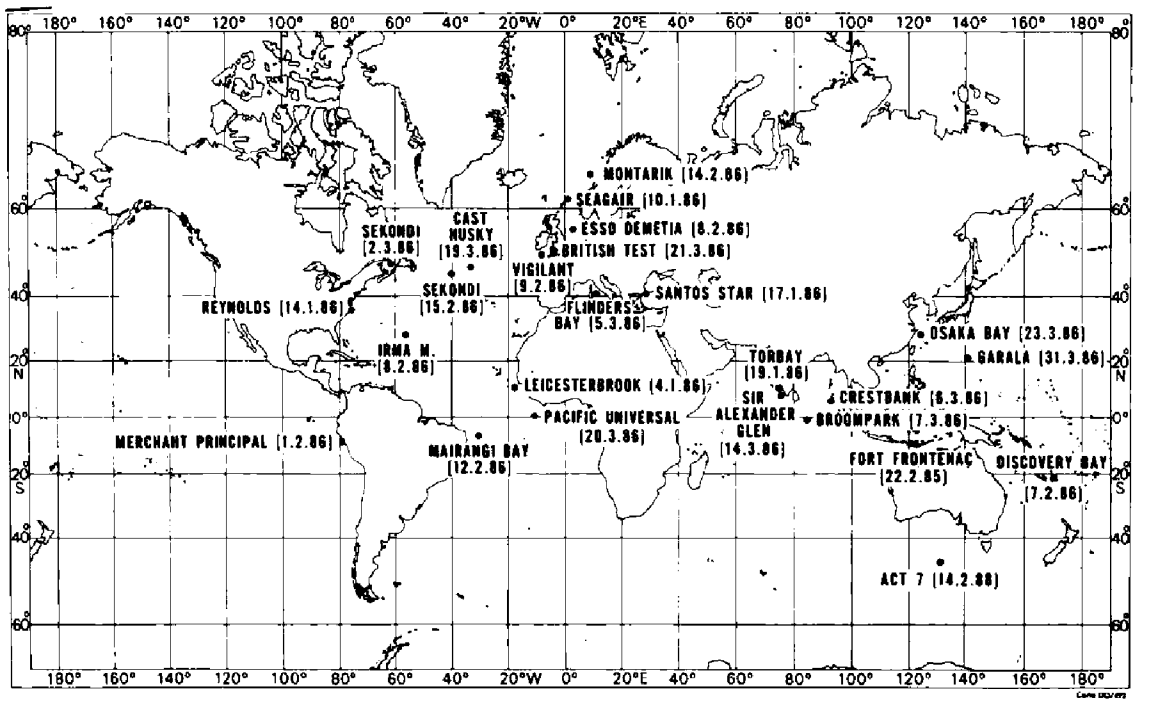
The Royal Yacht *Britannia*. (*See* page 4.)

The shower lasted for approximately five minutes and ended abruptly. Up until the time of the observation, no sea smoke, fog or mist had been sighted, visibility was good except in light snow showers, and was good after this shower, but it was noticed that the sea appeared to be steaming. This mist-like 'smoke' collected in the troughs of the swell, gathering to a depth of about 2 m.

The Arctic sea smoke lasted for two minutes and this was seen only in the area over which the snow shower had passed. At 1400, the air temperature was 2.4 °C, wet bulb 0.8 and the wind was N'ly, force 8; towards the end of the period of sea smoke, the air temperature was 1.9, wet bulb 0.9 and the sea-water temperature was 13.8.

It is assumed that the heavy snow shower had cooled the air in the local area to a point where sea smoke could form.

Position of ship: 46° 09'N, 39° 58'W.



Position of ships whose reports appear in *The Marine Observers' Log*

ABNORMAL WAVE

North Sea

s.s.v. *Seagair*. Captain M. Easton. On Station, Magnus Oil Field. Observers: the Master, Mr N.G. Pengelly, 2nd Officer and ship's company.

10 January 1986. Deteriorating conditions had been experienced since 1200 GMT the previous day when the wind had steadily increased and there was a rapid drop in pressure from 1017 mb.

At 0600 on the 10th, the wind had reached S'E'ly, force 12, and the pressure was 997 mb, falling. The swell at this time was logged as 10 m; however, at

daylight, when a more accurate measurement could be obtained, 15 m was thought to be nearer the true height. Continually, the swell increased in height in conjunction with the increase in wind speed, which, by later in the morning, was blowing at a steady 90 knots, with gusts taking the anemometer off the scale.

By 1100, heavy spray could be observed under the Magnus Platform, and was reaching up to the first and second levels. This spray indicated, and it was observed visually, that there was contact between the swell crest and the base of the spider deck, which was 12 m above MSL. This being the case, and taking in to account the total of the depth of the trough below MSL and of the crest's height above it, a height of 24 m was thought to be more accurate. Pressure at the time of the swell was 983 mb. (A photograph of a Magnus Field platform appears opposite page 20.)

At 1200, with the pressure at 981.6 mb, the ship experienced another large swell which caused superficial damage to the forecastle plating. Due to this, the vessel was run before the swell for two hours to allow investigation of the damage. The wind veered rapidly at 1400 to SSW'ly, and decreased to force 10, the swell also decreased. This was thought to be due to the passing of a front which had been predicted by the Met. Office, but which was later than forecast.

An extreme swell height of 19.9 m was recorded at 1200 by the Magnus Platform swell meter and was noted in their logbook.

Position of ship: 61° 36'N, 01° 18'E.

DISCOLOURED WATER

North Pacific Ocean

m.v. *Garala*. Captain R.B. Reid. Balboa to Kaohsiung. Observers: the Master, Mr R.P. Willis, 3rd Officer and Mr G.C. England, 3rd Officer.

31 March 1986. At 0036 GMT, the vessel was passing through thick concentrations of 'muddy' coloured deposits on the sea surface, blown in streaks in the direction of the prevailing SW'ly wind. We had been passing through smaller concentrations of them since 2200 the previous day.

The area passed at the time of observation was a particularly large area of unbroken deposit, about 200 m by 20 m, which was conspicuous by its size and for the fact that it was not being broken up by wind or sea, or blown along in streaks as were the other smaller deposits.

In total, we estimated the deposits to be covering an area of 20 n. mile both ahead and astern of the vessel, but could only observe them to about 5 n. mile on either side.

On consulting the *Marine Observer's Handbook*, we thought the most plausible explanation was the 'stinking water' phenomenon, discolouration due to the death of plankton. However, the sea temperature at the time was 26.3 °C, not showing a marked difference from the previous 'met' report. In addition, the size of the large deposit seemed to indicate some sort of spill, probably from a vessel in the area. Although we tried repeatedly we were unable to obtain a sample of sea water with the substance in it.

We should be most interested in your 'diagnosis' of the deposit.

Position of ship: 21° 04'N, 140° 51'E.

Note. Dr F. Evans, of the Dove Marine Laboratory, University of Newcastle upon Tyne, comments:

'The muddy colour was most likely due to a 'red tide' associated with the rather shallow water of the Marianas Group. It is very unlikely that so extensive a phenomenon could have been man-made. Red tides arise in warm, usually shallow, and highly stratified water during a period of stability. The cells causing the discolouration were perhaps not sufficiently dense to show up in a small sample of water. They cannot be seen individually since they are commonly less than 0.5 mm in diameter. The streaking was due to Langmuirian circulation in the sea, the principal cause of slicks. I feel there is no particular reason to suppose that the microscopic plants of the red tide would be dead; their fate usually is to be eaten.'

CETACEA

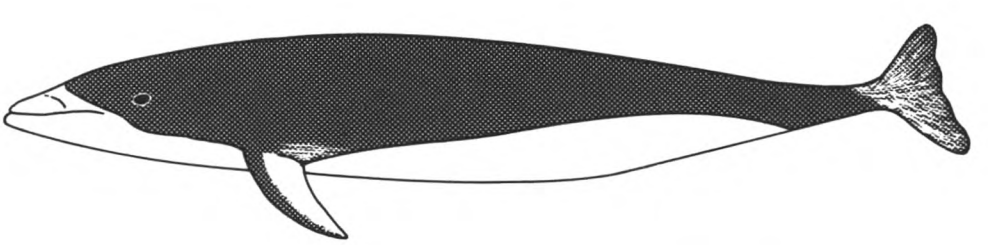
Southern Ocean

m.v. *ACT 7*. Captain D.M. McPhail. Rotterdam to Melbourne. Observers: the Master, Mr W.P. Mitchell, 3rd Officer and members of the ship's company.

14 February 1986. During the evening, as a rain shower advanced towards the ship, a large area of disturbed water was observed off the port bow. At first it was thought to be a large school of dolphins, but as the vessel got closer, we were perplexed by the shape of them.

Soon we saw the horizontal tails and could make out the black-and-white undersides, but the shape was still odd. The school continued back and forth across the bow, attracting a great deal of interest from the petrels and albatrosses which were present. By the time the vessel reached the school, we could only guess at the number of dolphins, there were literally hundreds of them, ranged about the bow and starboard beam, from close alongside to about half a mile distant. Their direction was totally random, and all seemed extremely excited, taking no apparent interest in the ship. We assumed they were feeding.

We were able to observe the dolphins at close range, and noted a body length of 2.0–2.5 m, a slim, sleek shape, black colouring on the back, white on the underside, with a clearly defined boundary between the two colours, see sketch.



They had no dorsal fins, which accounted for their peculiar appearance. Their pectoral fins were white, some having a black leading edge, and in these dolphins, the black colouring merged into the fins.

The colouring and distinct absence of the dorsal fin makes us confident that these were Southern Right Whale dolphins. By all accounts, sightings of this species are rare, but the number we saw alongside the vessel, we conservatively estimated at 500 plus. Attempts to photograph the sighting were frustrated by the rain shower and the onset of dusk.

Position of ship: 46° 03′S, 126° 52′E.

Savu Sea

m.v. *Fort Frontenac*. Captain B. Roberts. Weipa to Porto Vesme. Observer: Mr A.M.P. Henderson, Chief Officer.

22 February 1985. At 0300 GMT, while passing through the Indonesian islands, many schools of dolphins were seen, with individuals totalling three figures, and all too far away for the identification of species.

This sighting was unusual however, because of the strange behaviour of some of the dolphins. What at first looked like a branch of a tree was seen to rise vertically from the rippled sea. It stayed up for about 5–6 seconds, and then sank again, repeating this several times. Then, close alongside it, another did the same. When a third 'branch' rose in unison, it was realized that this was no tree trunk rising and falling in the swell.

Closer examination revealed that the 'branches' were in fact the tails of dolphins. Other tails appeared until there were seven showing, in an almost straight line, 1.0–1.2 m apart. They would all appear virtually at the same time, rise until about 60 cm of body was showing, stay that way for several seconds, and then slide down, again almost at the same time.

The show lasted for a few minutes, and then the dolphins rejoined their fellows. We wondered whether this was a way of feeding or some kind of game, and why such symmetry of line and movement.

Position of ship: 09° 00′S, 122° 00′E.

Note. Mr D.A. McBrearty, of the Department of Anatomy, University of Cambridge, comments:

'What the observers were watching is known as "pitch-poling". I have seen it done by two animals together but never a whole "chorus line". The reverse manoeuver, raising the head and shoulders bolt upright in the water is known as "spy-hopping". A friend of mine once saw a line of five Killer Whales doing this off the Canadian coast some years ago. Pilot Whales often do it, so do Bottlenose Dolphins, even some large whales such as the Humpback and Right Whales do it. I suspect that most of the slow-swimming species do it, but why, I really don't know.

'Keeping in line and formation is not difficult and you will find that symmetry of movement is common whenever two or more dolphins are together. You sometimes find that when a school is moving and jumping, it is often difficult to spot calves within the school, so close do the young keep to the parent cow. If you could listen to them, you would hear a constant stream of bird-like "twitter" with which they keep station.'

South Pacific Ocean

m.v. *Discovery Bay*. Captain A.J. Fee. Los Angeles to Sydney. Observers: the Master, Mr D.K. McCleod, 2nd Officer, Mr J.W. Stockdale, 3rd Officer and Mr W. Inglis, Chief Engineer Officer.

7 February 1986. A large whale was observed at 0000 GMT about 1.0 n. mile ahead of the vessel, and at first glance, was thought to be two whales in close proximity to each other.

We altered course to avoid them, and then noticed that 'they' was only one whale which had a distinct double blow.

This whale passed down the port side, and then dived under the surface, not reappearing again until some distance from the ship. On looking through the drawings that we had on board, the whale was thought to be a Right Whale.

Position of ship: 21° 56′S, 170° 55′E.

Note. Mr D.A. McBrearty comments:

'Right Whales should be relatively easy to recognise at sea due to several very distictive features. The head is large, at least a quarter or more of the whale's total length which can be in excess of 15 m. The jaw line is strongly arched almost to the top of the head and several light-coloured growths or "callosites" can be seen at the front of the rostrum and along the chin and lip line. These callosites are very noticable against the dark body colour and are usually infested with whale lice.

'In common with all mysticetes, the Right Whale has twin nostrils or blowholes, but unlike the others whose blowholes are close together and produce a single plume, those of the Right Whale are set wide apart and show a distinct "V" shape. The blow is bushy, can be as much as 5 m high and is a valuable recognition characteristic of the species at sea.

'Other characteristics of this whale are that it has a smooth back completely devoid of any dorsal fin. When the whale dives deep, it goes down almost vertically and throws the tail flukes high out of the water. The flukes are almost triangular, with smooth edges with a deep central notch similar to, but more pointed than those of the Sperm Whale. The forelimbs have a roughly broad, square paddle shape.

'The Southern Right Whale can be found in widely separated areas throughout the Southern Ocean. It has been seen regularly off Australia, New Zealand, South Africa and South America, although nowhere can it be said to be in any great numbers. It was brought perilously close to extinction before being made a protected species in 1935. Nevertheless, it does now seem to be making a slow but somewhat protracted recovery.

'Right Whales are slow swimmers, and in temperate and tropical waters, are found close to the coast in bays and off islands. They have a generally north/south movement, roughly between 20° S and 50° S, spending the summer in the south and winter to the north. Why the particular whale observed should be so far to the north of its range during the austral summer, I really do not know.'

SEALS

Gulf of St Lawrence

m.v. *Sekondi.* Captain E.J. Watterson. Contrecoeur to Land's End. Observers: the Master, Mr G. Laversuch, 3rd Officer, Mr J. Nolan, Radio Officer and Mr A. Watson, Senior Electrician.

2 March 1986. Between 1200 GMT and 1600 GMT, when the vessel was passing to the north of the Madeleine Islands in the Gulf of St Lawrence, numerous seals, singly or in pairs were sighted; they would bob up in a clear patch of water and watch the vessel for a few seconds before sinking below the surface. Thirty seconds later, the same seals would repeat their suspicious observation of our ship, and would keep doing so until the vessel was well clear.

At 1330, whilst 21 n. mile north of Brian Island, we were navigating with some difficulty through close pack-ice. Apporoximately 150 m from our starboard side, there was an ice floe of about 10 m^2 in area, with about 30 cm clearance of the water and some open water around it. On this floe was a large seal, 2 m long, presumably female, with a pup of about 40 cm. The pup was a cream/white colour and remained in the same place, although it did move its head. The adult was a dark brown colour and circled its pup four or five times, stopping now and then to move its head and upper body up and down as if trying to ward us away. At no time did it leave the pup and enter the water as previous seals had done on the approach of the ship.

Around the pair, the snow was stained with the signs of recent birth, and a number of large black-and-white gulls were scavenging on the ice floe.

Position of ship at 1330 GMT: 48° 08′N, 61° 36′W.

JELLYFISH

Peruvian Waters

m.v. *Merchant Principal.* Captain J.K. Corrin. At anchor, Chimbote. Observers: the Master, Mr M.E. Winter, Chief Officer and ship's company.

1 February 1986. For two days our vessel was anchored at the entrance to Chimbote harbour whilst awaiting berth. During this time, large concentrations of jellyfish (*see* photograph opposite page 21) were observed drifting in with each incoming tide. So dense were these groups that at times they covered 50 per cent of the sea surrounding the vessel.

The harbour entrance seemed devoid of any other surface-feeding fish or seabirds, and a pungent aroma, possibly sulphur-based was present.

On two successive flood tides there were problems for the ship's engineers, as the jellyfish kept blocking the generator cooling water intakes.

Position of ship: 09° 06'S, 78° 36'W.

Note. Dr F. Evans comments:

'The photograph shows a fine assemblage of one of the compass jellyfishes, *Chrysaora*. The jellyfish are so called after the sixteen-pointed design on the umbrella surface. The species is very likely *Chrysaora plocamia* which is the form commonly found in South America and which was first described (in 1830) off Peru. There is a closely related species in Atlantic waters and another in the North Pacific Ocean.

'Compass Jellyfish are known to rise towards the surface as the tide strengthens, which explains the blocking of the cooling water intakes on two successive flood tides. The jellyfish are seasonal; they grow during the year, reaching their maximum size in the summer, as here, before breeding and dying off. The smell *may* have been related to the release of eggs. The animals are said to have only a weak sting; indeed the sting of the Atlantic Compass Jellyfish can hardly be felt.

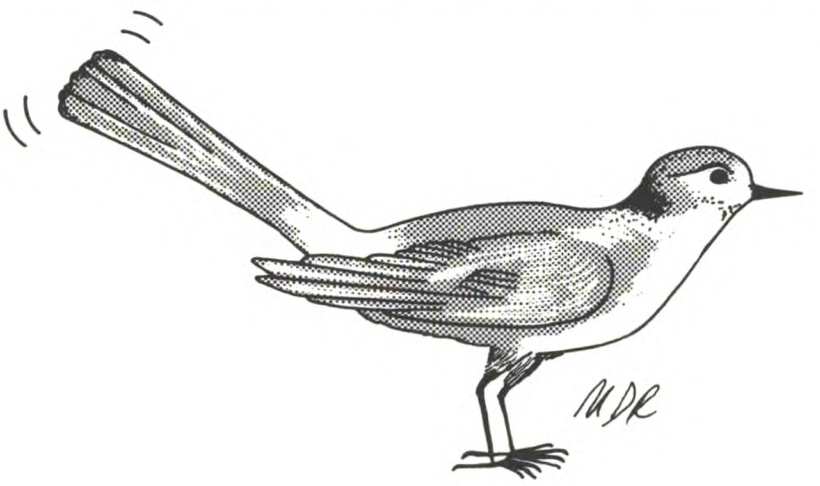
'It is interesting to note in the photograph the range of colours in the various individuals. Compass Jellyfish of a single species may be without colour, with a dark pattern on a light ground or with a light pattern on a dark ground, and such variation may be seen in this swarm.'

BIRD

East China Sea

m.v. *Osaka Bay*. Captain J.K. Blackburn. Hong Kong to Busan. Observers: Mr P.D. Davies, 1st Officer, Mr K.R. Elliot, 3rd Officer and Mr M.D. Rishton, Cadet.

23 March 1986. During the morning the bird shown below unwittingly flew



into the chartroom. It was promptly shut in while a description was taken, then it was set free and was not seen again.

Thought to be a Yellow or Grey Wagtail, it measured 12.5 cm from tail to beak and its body size was similar to that of a sparrow. The body was grey/brown above with a black streak over the eye and an area of white between the eye and the beak, whilst the undersides were yellow, but with white throat patches. The tail was brown and 'wagged'.

At the time the dry bulb temperature was 10.0 ° C, wind N'ly, force 6 and there were 4 oktas of cumulus.

Position of ship: 29° 11'N, 124° 17'E.

Note. Commander M.B. Casement, Chairman of the Royal Naval Birdwatching Society, comments:

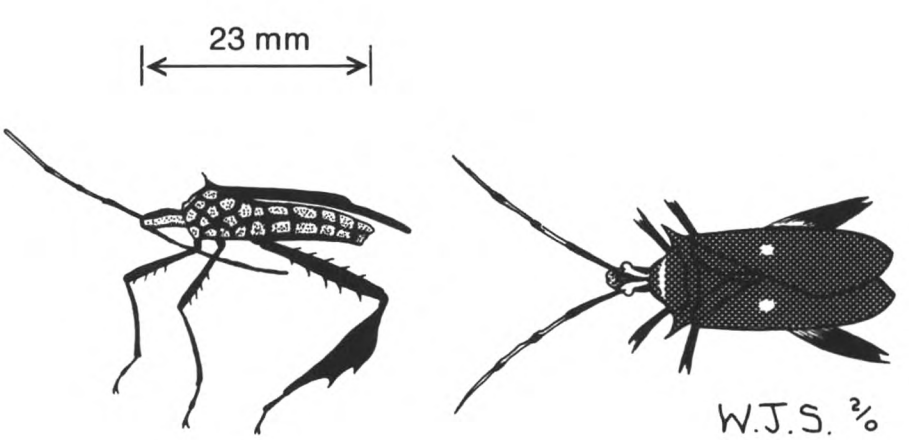
'This is probably a Yellow Wagtail (*Motacilla flava*). There are many different races/sub-species with minor differences in head colour.'

INSECTS

Eastern North Atlantic

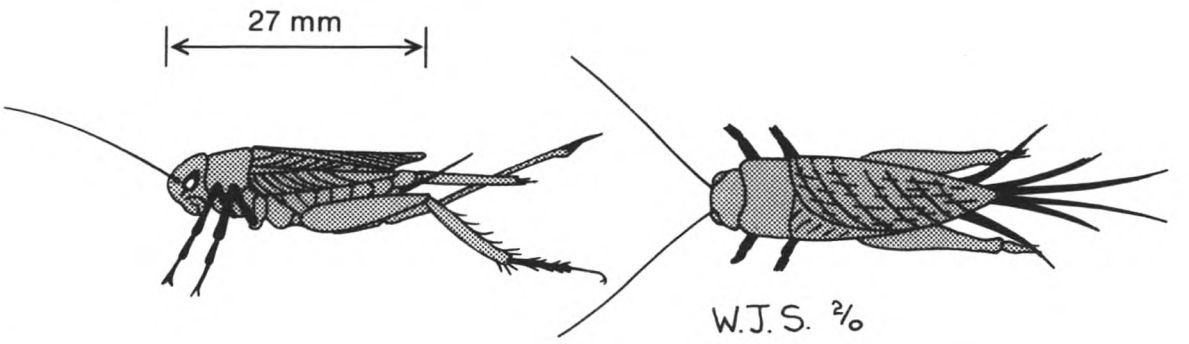
m.v. *Leicesterbrook*. Captain R.G. Davis. Las Palmas to Ascension. Observers: the Master, Mr S.J. Messruther, Chief Officer and Mr W.J. Stafford, 2nd Officer.

4–5 January 1986. During the night, an insect shown in the first sketch was found in the accommodation. It was beetle-like, having hard wing covers and



measured 23 mm from head to tail. The body was black, with orange markings, and it had matt black wings with one orange dot on each. Its antennae were also black and orange, whilst the legs were entirely black. The ship was 70 n. mile from the nearest land, the wind was N'ly and light, the sky fine and clear.

The following day, when 200 n. mile from land, the Second Officer found another insect, shown in the second sketch. This one was crawling around the bridge wing. It was glossy black all over, 27 mm long, and appeared to dislike direct sunlight.



Weather conditions were the same as for the previous observation.
Position of ship on 4 January: 10° 42′N, 17° 20′W.
Position of ship on 5 January: 07° 56′N, 16° 50′W.

Note. Mr W.R. Dolling, of the Department of Entomology, British Museum (Natural History), comments:

'The first insect is Heteroptera, *Leptoglossus australis* Fabr. (Coreidae), a widespread minor pest in the Africa/Asia tropics and sub-tropics.'

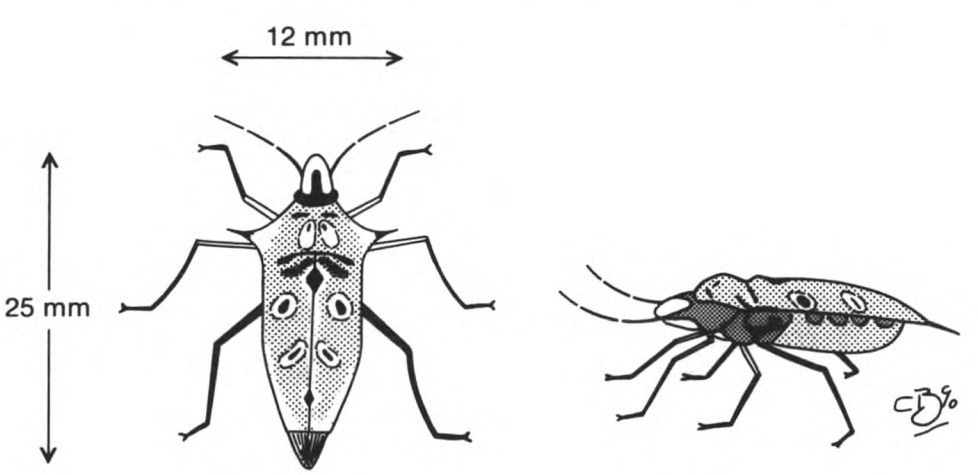
Mrs Judith Marshall identified the second one as 'a female Black Field-cricket (*Gryllus bimaculatus* De Geer).'

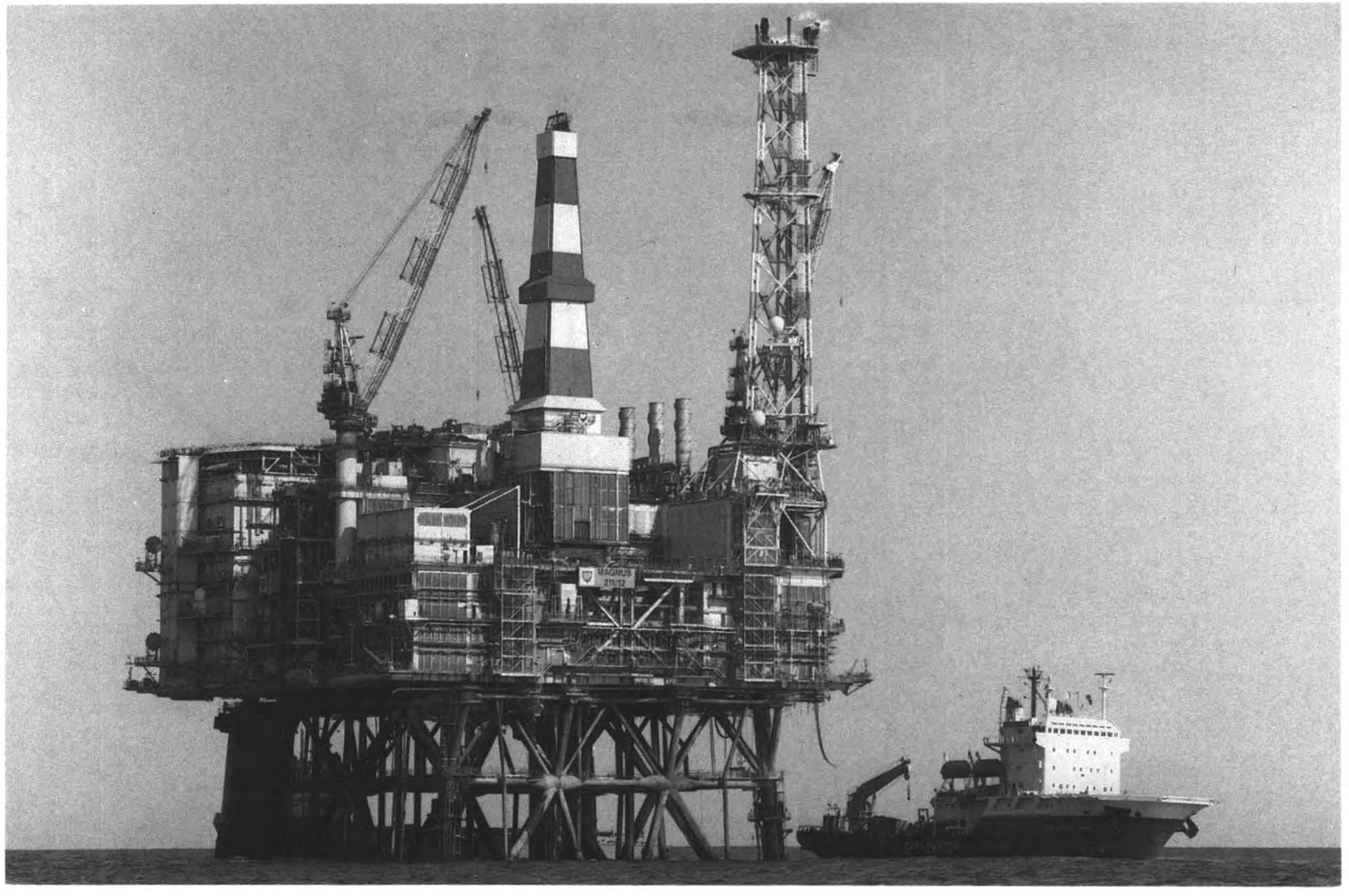
Indian Ocean

m.v. *Crestbank*. Captain A.B. Osborne. Singapore to Suez. Observers: the Master, Mr C.C. Baines, Chief Officer, Mr A.J. Dixon, 2nd Officer, Mr L. Rigby, 3rd Officer and Mrs Osborne.

6–8 March 1986. At 1700 GMT when the vessel was some 80 n. mile off Sumatera, some insects, as shown in the sketch, were noticed on the bulwarks and deck in the area of the bridge.

Measuring about 25 mm in length and 12 mm at the widest point on their backs (between a pair of spiky horns), the insects' colouring was predominantly



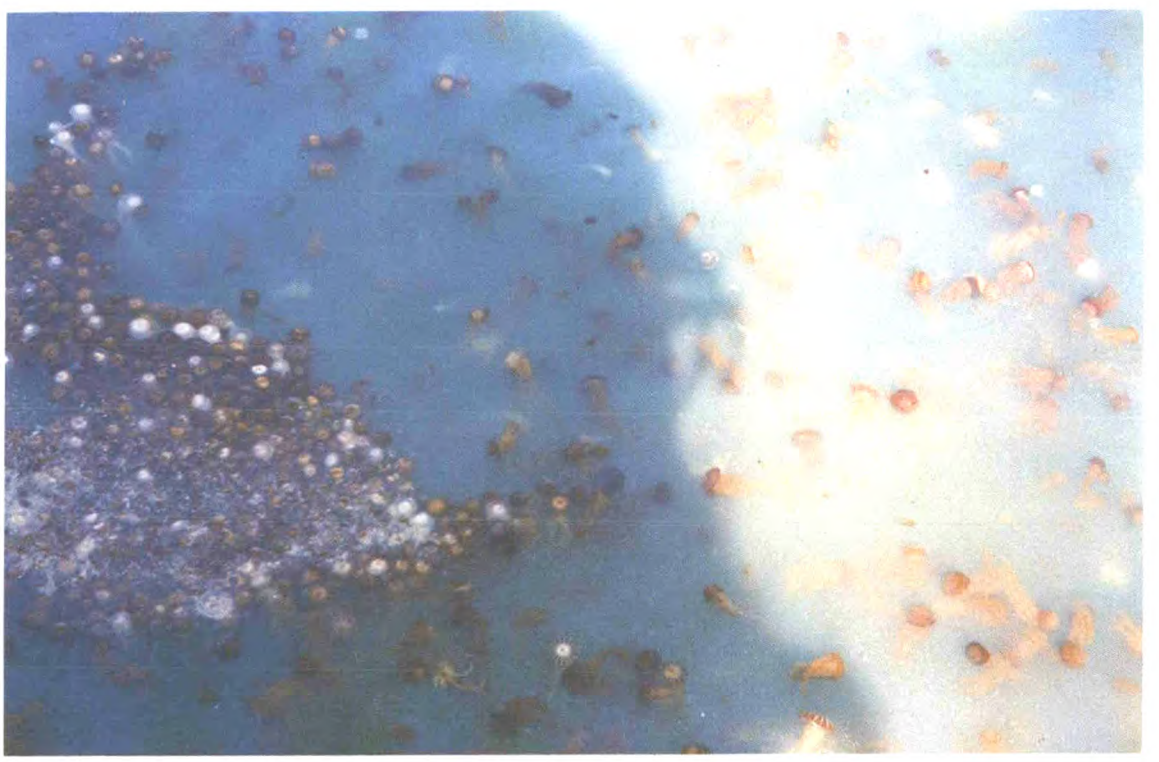


A Magnus Field oil platform, showing, at the first level above sea surface, the spider deck. (*See* page 14.)

Photo. by courtesy of B.P. Petroleum Development Ltd

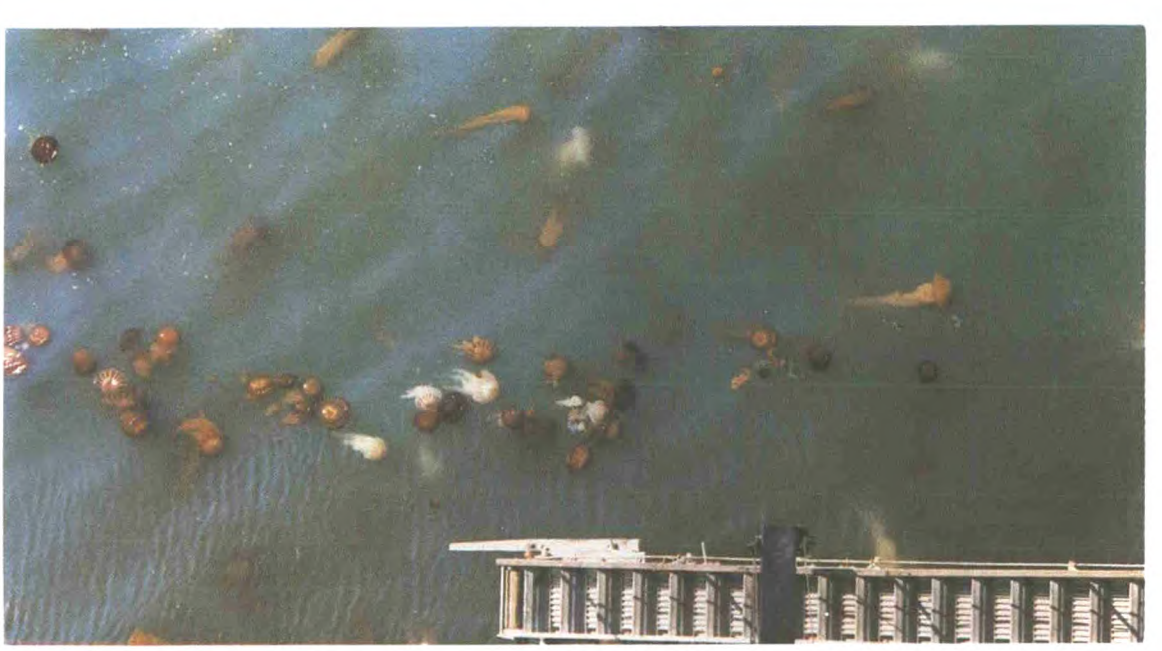
Opposite page 20

Opposite page 21



Jellyfish photographed from m.v. *Merchant Principal.* (*See* page 18.)

Photos by M.E. Winter



light brown on the shell, with lighter and darker areas surrounding a pattern of black dots. The number and shape of these dots varied with each insect, no two specimens being the same. On the abdominal region, the colour was oatmeal, with four distinctive spots of emerald green on either side, whilst the lower part of the front legs, the back legs, and generally the front underside were also an emerald green colour.

The insects' movements were very similar to that of a cockroach, but unlike the latter, did not retreat when approached or prodded, moving forward to investigate instead. Their numbers only became apparent at dawn the following morning, and must have totalled 250–300; it was also at this time that the majority of them took flight and left the vessel.

Twenty-four hours later, another insect was found. Having a similar size and shape to the others, its colours were completely different. Its shiny shell of brilliant pink, gold, purple and green, made it appear more like a beetle. The legs and antennae looked to be slightly longer than those of the first insects found, and in addition to walking both backwards and forwards, tended to favour a sideways crab-like walk.

The wind was mainly W'ly, force 4 throughout.

Position of ship: 05° 51'N, 93° 40'E.

Note. Mr J.H. Martin, of the Department of Entomology, British Museum (Natural History), comments:

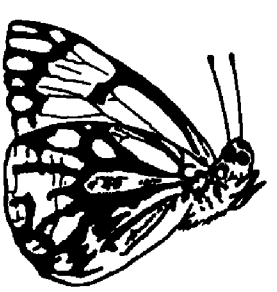
'This nicely-drawn specimen seems to be *Cantao ocellatus* Thunb., a member of the pentatomoid family Scutelleridae, which has an Oriental distribution. The brightly-coloured insect referred to was probably another scutellerid — some of that family do have remarkable metallic colours as described.'

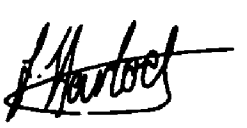
BUTTERFLY

Mediterranean Sea

m.v. *Flinders Bay*. Captain D.A. Dornom. Piraeus to Genoa. Observer: Mr J. Harlock, 3rd Officer.

5 March 1986. At 1300 GMT, the butterfly shown in the sketch was found on the starboard bridge wing. The main colours were a light sandy background, with dark brown markings. Its body was 2.5 cm long, as were the wings, whilst the feelers were 9 mm long.





At the time, the vessel was heading north-west along the Italian coast.
Position of ship: 41° 30′N, 11° 36′E.

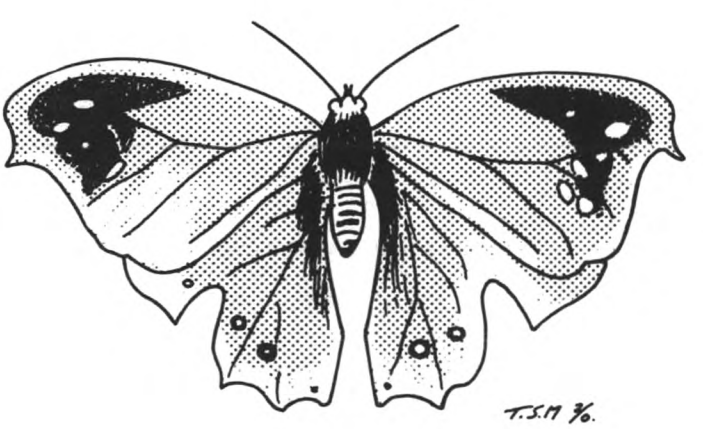
Note. Mr C.R. Smith, of the Butterfly Section, Department of Entomology, British Museum (Natural History), comments:

'The species is a Brown-veined White butterfly (*Anapheis aurota*, family Pieridae). This is an African relative of our own "white" butterflies. To quote R.H. Carcasson's *Collins Hand Guide to the Butterflies of Africa*, the species is "very common in all open habitats throughout Africa, Arabia, the Middle East, India. Often migrates in large numbers..." I assume the butterfly was flying from North Africa; it probably mistook the *Flinders Bay* for land when it hitched a ride.'

Indian Ocean

m.v. *Sir Alexander Glen*. Captain D. Willey. Singapore to Khawr Fakkan. Observer: Mr T.S. Moseley, 2nd Officer.

14 March 1986. At about 1000 GMT, numerous butterflies, one of which is shown in the sketch, were found dead on the decks.



The insects measured 78 mm between the wing tips and all were of the same species. They had dark brown wings, with black, orange and white markings on the upper wings. There were black spots with white centres on the lower wings. Their bodies were a brown/grey colour.

Position of ship at 0600 GMT: 07° 49′N, 75° 54′E.

Note. Mr C.R. Smith comments:

'From the sketch, they would appear to be *Melanitis leda*. This member of the Satyridae is widely distributed in the Old World tropics, and is a familiar sight at dusk, when it is active. It has been found in numbers on ships but does not appear to stray far from land. I would guess the butterflies landed on the ship in the evening, and probably died of dessication before discovery the following morning. The adult butterflies are harmless, but the larvae feed on a variety of grasses, and can be a minor pest of rice and similar crops.'

LOOM OF LIGHT

Equatorial South Atlantic

m.v. *Mairangi Bay*. Captain C.R. Short. Port Chalmers to Zeebrugge. Observers: Mr R. Moxon, 2nd Officer, Mr D.R. Peel, 2nd Officer and Mr R. Lear, LSM.

12 February 1986. At 0200 GMT, the loom of a flashing light was observed to port, bearing 318°. This caused some surprise since the vessel was some 300 n. mile off the Brazilian coast at the time.

Subdueing the initial feelings of panic and the instincts to run around with cups of coffee, a series of compass bearings was taken, and reference to the light lists showed the light to be that on Ilha Rata. The radar was also showing strong echoes between 48 n. mile and 60 n. mile on the same bearing which gradually increased over an arc of 90°. We were unable to tell if this was caused by heavy rain or by ducting from the Brazilian coast.

Ten minutes before the observation, the navigation lights of a south-bound vessel had been clearly visible at 24 n. mile, and the ship's steaming lights appeared to move farther apart at a distance of 20 n. mile. The ship also assumed giant proportions, thus suggesting refraction.

It was thought that the abnormal refraction and reflection from a distant cloud base could account for the nominally 18-n. mile light being observed at 180 n. mile.

Weather conditions at the time were: air temperature 26.7 °C, wet bulb 24.8, pressure 1014.2 mb, wind light and variable. The sky was clear although there had been light rain showers about two hours earlier, with lightning observed at some distance.

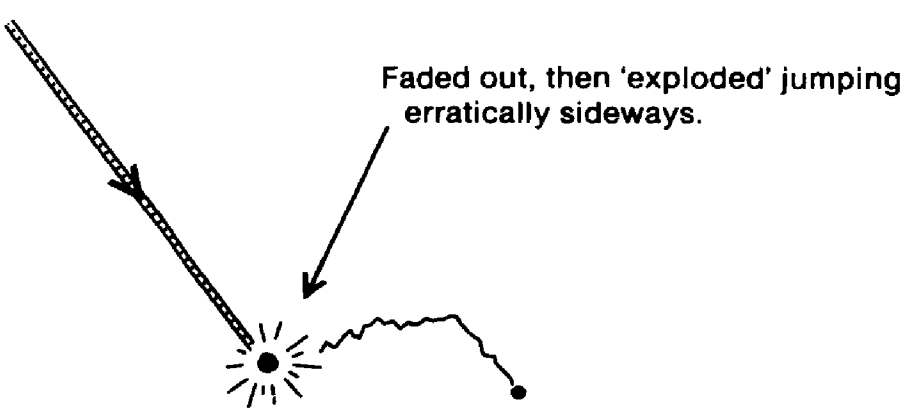
Position of ship: 06° 05'S, 29° 56'W.

METEOR

Arabian Sea

m.v. *Tor Bay*. Captain M.J. Godbehear. Mina Qaboos to Kobe. Observers: Mr R.J. Buckley, 3rd Officer and Mr D.S. Flemington, Radio Officer.

19 January 1986. At 1545 GMT a meteor was sighted. It became visible at an altitude of about 50°, bearing 065° from the vessel, and remained visible for 2–3 seconds, falling at an angle of about 45° from the vertical. At this time, it appeared to fade out, but about half a second later, at the same position in the sky (altitude about 25°), there was a bright white flash, and the meteor was seen to jump erratically sideways for about one second, as shown in the sketch.



Five minutes later, another meteor was sighted at an altitude of 45°, bearing 120°. This one was much larger, about one tenth of the moon's diameter, and as it fell at an angle of about 45°, it left a trail approximately equal to 5° altitude in length. The trail was reddish in the middle and white at the edges. This meteor was visible for three seconds.

Position of ship: 10° 34′N, 75° 21′E.

AURORA BOREALIS

North Sea

m.v. *Esso Demetia.* Captain A. Washbourne. Fawley to Sullom Voe. Observer: Mr M.M. Adams, 2nd Officer.

8 February 1986. Between 2200 GMT and 2255 GMT, the aurora borealis was seen. A moderate to bright glow was observed stretching from the zenith to the northern horizon, and occasionally, a few vertical rays were also seen. The display lasted for about 30 minutes, with the maximum intensity lasting for approximately 5 minutes at 2215. (No pulsating effect was seen.) Reaching from 25°–90° in elevation, the arc lay in the direction of 290°–045°; its colour was pale in tone, grey in colour.

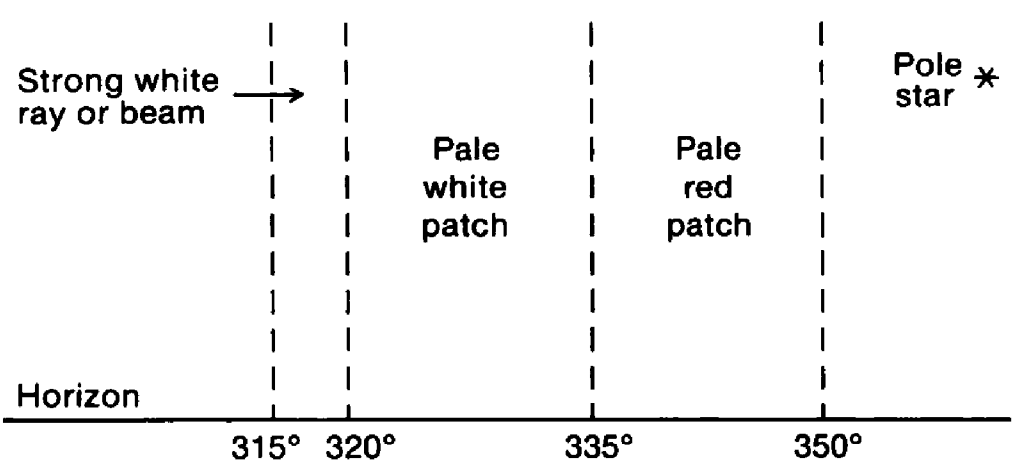
At 2249, a bright arc from 310°–360° was seen over the northern horizon, with a maximum elevation of about 30°. Some parts were very bright with vertical radiations, and the colour was pale grey.

Position of ship at 2200 GMT: 55° 50′N, 02° 50′E.

North Atlantic Ocean

m.v. *Irma M.* Captain D.R. Mountford. Cortes to Bremerhaven. Observers: the Master, Mr P.E. Harwood, Chief Officer and Mrs Harwood.

8 February 1986. At 2330 GMT, the aurora borealis was observed bearing 320°–350°, extending to the height of the Pole star and following the form shown in the sketch. Other stars were clearly visible through the display. Neither the



patch of red nor the white light flickered or wavered, and the display faded completely by 2350.

Position of ship: 28° 48′N, 55° 48′W.

Scottish Waters

m.v. *Vigilant*. Captain D.L. Rattray. Vessel on fishery protection duties. Observers: Mr G.C. Lunny, 2nd Officer, and Mr C. Cunninghame, Seaman.

9 February 1986. Whilst south of the Flannan Isles, the aurora was seen in the northern sky between 0030 GMT and 0055 GMT. The display commenced with wide rays of light, increasing and decreasing in intensity (light equivalent of that of a full moon), thence to curtains of light, and then to a 'sand' effect. This latter display was most unusual and spectacular; in it, the light appeared as a mono layer of silver sand which was being moved by a high wind, and viewed from below. The locus of the display was north (magnetic) ±40°.

The 'silver sand' effect lasted about seven minutes, after which, the aurora ceased at 0055.

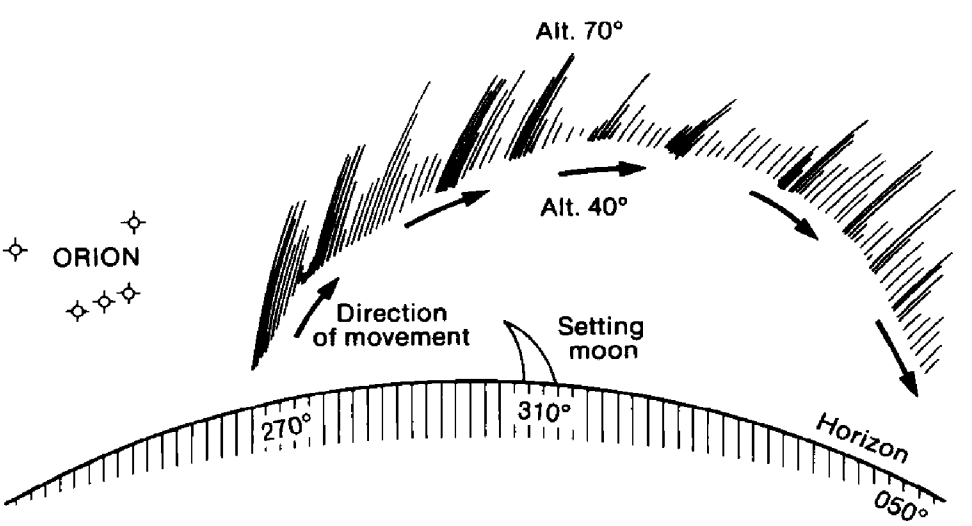
Position of ship: 51° 06′N, 07° 30′W.

Norwegian Sea

m.v. *Montarik*. Captain W.F. Jeffrey. Mo-i-Rana to Caen. Observer: Mr A.M. Farooqui, 2nd Officer.

14–15 February 1986. Between 2340 GMT and 2350 GMT, the aurora was observed at an altitude of about 40°, towards the north-west, and against a clear sky.

The display was repeated between 0010 and 0100 on the 15th, and took the form shown in the sketch, changing in beautiful shapes and colours (whitish-



green, pink and bright white). It seemed that the lights were playing with each other, happily moving from west to east, then from east to west very quickly, eventually moving towards the east and fading gradually.

Position of ship: 65° 30′N, 09° 42′E.

SATELLITE RE-ENTRY

Indian Ocean

m.v. *Broompark*. Captain J.G. Ridley. Richards Bay to Inchon. Observer: Mr B.P. Murphy, 3rd Officer.

7 March 1986. At 1503 GMT, what was thought to be a satellite re-entering the atmosphere was observed bearing due north of the vessel, at an altitude of about 30°. It was moving relatively slowly (compared with a meteor) towards the Earth at an angle of about 70° to the horizon, and was very bright, becoming larger as its altitude decreased, finally burning up at about 8° altitude.

There was no cloud cover at the time of observation which made the sighting very clear, the object was visible for about ten seconds.

Position of ship: 01° 52′S, 84° 14′E.

551.5(04):551.509

Weather Forecasting: Magic, Art, Science and Hypnosis*

By A.A. Neale**

(Presidential Address delivered at the Fifth Annual Conference of the Meteorological Society of New Zealand, 10 October 1984)

Introduction

Previous Presidents have established a tradition of selecting for their address a topic closely related to their particular involvement in meteorology. In my case the topic is weather forecasting, a subject with which I have been closely associated for over 35 years.

It is not unique to spend so long professionally forecasting the weather. From the ranks of those who have retired from the New Zealand Meteorological Service, there are a number who have been involved in this way. Some of those currently employed in the forecasting service appear likely to do likewise, and I believe that there will be many more after them.

Addiction to weather forecasting

What is the attraction that keeps forecasters at the task for so many years?

It can't be the glamour of the job: few occupations have such poor promotional material — there are countless jokes and cartoons portraying the luckless forecaster being caught out by the weather.

But hold on a minute, perhaps there is some glamour coming on the scene in the form of TV stars presenting the late weathercast. Still, on reflection, this is not supported by any clamour of staff to do the evening telecast and 'star' on the box.

Is it the attractive hours of work? Hardly. Few willingly offer to do extra night shifts, and weekend work plays havoc with social activities.

Since its the 'getting it right that counts' with weather forecasts, forecasters can be under no illusion that the public won't hate them from time to time. After all, even on the best days, one forecast in five is likely to be less than memorable; on bad days, the odds are more heavily stacked against them.

Despite all this, a dedicated team of forecasters come back day after day, night after night, year in and year out, with barely dampened enthusiasm. Why?

The job must have hidden attractions. Maybe it is in the 'art' that is involved, and the magic, the science and hypnotism. And that's not all; forecasting involves a bit of Miss Marples and Colombo, as well as a spicing of our dual national passions: gambling and sport. These could be what keeps forecasters on the job.

Magic — enter the witch doctor

To explain this, first travel back with me to beyond the Golden Age of Greece, when art and science were burgeoning; back to the early tribal beginnings of the human race. Back to the time when our ancestors lived in an environment permeated with superstition and the wrath of evil spirits.

Then, witch doctors held great power. They could intercede with the spirit world that had such power over mere mortals. The witch doctor was held in high

---

* Reproduced from *Weather and Climate* (1985) 5, by kind permission of the Editor.

** Mr Neale is Chief Forecaster of the New Zealand Meteorological Service. The views expressed in this article do not necessarily reflect the viewpoint of the N.Z. Meteorological Service.

regard by the tribe: the position he held was safe provided that he was seen to intercede successfully on behalf of the tribe.

When drought threatened the tribe's food supply, the witch doctor would need to call for a 'rain dance' to propitiate the spirits, and end the drought. In such circumstances, the problem facing the witch doctor would have been to arrange the time of the dance so that there would be a good chance of rain falling subsequently. While a few failures could be explained away, it was imperative that, more often than not, rain would follow the rain dance.

It is not beyond the bounds of possibility that during many years — even generations of witch doctors — through carefully observing the weather sequences, the witch doctor fraternity could have come to associate certain 'signs' in the sky with the increased likelihood of subsequent rain. This knowledge could have been handed down as part of the sacred and secret knowledge restricted to the witch doctor, and used to enhance the witch doctor's standing in the tribe.

If this supposition is correct, it indicated the beginnings of scientific endeavour — careful observation and association of sequential events. These lead logically to 'rules of thumb' whereby some quite good weather forecasting can be done: 'red sky at night, shepherds' delight; red sky in the morning, shepherds' warning' is one of these.

Hence this could be looked upon as science in weather forecasting, but to the tribe as a whole it appeared to be magic.

The art of forecasting

Time now to return to the present, or almost the present.

Not long ago forecasting was an art; in the nineteenth and early twentieth centuries, gentlemen scientists carefully observed the weather, compared experiences of encounters with storms, and gradually deduced models of weather systems.

These models lacked scientific explanations of what went on in the systems — the way the air moved, rose and descended, etc. That knowledge was to come later. In the meantime, forecasts were based much more on art than science.

As aviation developed, so did weather forecasting. Initially, just as early pilots would fly 'by the seat of their pants', so did forecasters; the latter tended to resort to 'imaginitive ideas' in their picture of what happened in the atmosphere.

In addition to 'imaginitive ideas', dictionaries define art as 'cunning'. There may be a little cunning even today in the way forecasts are arrived at, so there is still some art to be found in weather forecasting.

Art of a different kind is seen in the very weather maps forecasters prepare. Isobars sweep and swirl majestically across the charts in an ever-changing kaleidoscope of patterns. Who knows how many potential Van Goghs and Picassos there may be in weather offices around the world.

With the modern trend to the use of natural materials depicting patterns from nature, there would seem to be scope for the forecasters' art to surface in carpets and on wallpapers.

The giant jigsaw in the sky

Weather reports reach the forecaster from many sources. Each brings a packet of information about a part of the atmosphere. If you think of the weather situation as being a giant jigsaw puzzle, each report can be thought of as being a piece of the puzzle.

When the forecaster receives as many reports as needed to give a complete

analysis of the situation (in other words, receives all the pieces of the jigsaw), then there is no problem. However, even on good days, reports are far too few — many of the jigsaw pieces are missing. It is then that the forecaster must resort to skill, knowledge, experience — even art — to decide how to fill in the missing parts of the puzzle. All too often more than one solution fits what information is there; but only one solution is correct. The forecaster must make a choice. This amounts to gambling, with the forecaster staking his or her reputation on the choice made.

Even after this first choice is made, further choices follow — some easily, others with extreme difficulty. In effect, the forecaster must answer a host of questions: Will it rain? If so, how heavily? Will there be a southerly change? If so, will it arrive in the morning, or in the afternoon? How much cloud will there be? Will the morning be windy?

Should the forecaster hedge his or her bets? Perhaps go for a bit of everything, in the hope of getting something correct. Forecasts such as: 'Fine this morning apart from isolated showers. However, in the afternoon, showers becoming more widespread, especially about the ranges' can give the impression that just such a strategy is being followed.

Mystery and Miss Marples

Ghosts of Maigret, Miss Marples, and their modern successors, Kojak and Colombo, haunt forecast rooms.

Each weather report contains a piece of evidence — evidence about the weather. Much of the evidence from the many reports received cross checks, thereby establishing the credibility of the reported weather. However, from time to time, pieces of evidence seem to be too far-fetched to be credible. All forecasters have known the experience of receiving a report which, on first sight, just can't be correct. Then, after a few minutes reflection, the doubt surfaces: 'maybe the report is correct.'

This, then, is where the detective streak in the forecaster manifests itself in the continual sifting of evidence in weather reports. Constantly there is the trying to fit it all into a single credible picture, and finally discarding the false clues.

A report is seldom made incorrectly. It can be altered unknowingly by the introduction of errors during transmission from one place to another. Sometimes a report is credited to the wrong time of day, or the wrong place.

So, just as Miss Marples and Colombo have to deal with accurate and inaccurate evidence, so do forecasters the world over.

Science to the rescue

Science, whose earliest beginnings may have been linked to what our tribal ancestors saw as magic or the supernatural, really came of age in the 1960's and 1970's, boosted by electronic computers and meteorological satellites. With their help, weather forecasting was placed on a much firmer footing.

Computers, with the ability to make very rapid calculations, enabled the equations describing the behaviour of the atmosphere to be solved well before those events happened. Prior to the advent of computers, this w not possible —the events would have occurred long before they could have been calculated and predicted.

Even today, though, the equations are not able to tell us everything we need to know about the atmosphere. For this reason, 'scientific' weather forecasts by computer are far from perfect, and forecasters are called upon to evaluate

computer forecasts and, if necessary, improve them. Nevertheless the new methods do greatly aid forecasters by providing types of information which were not previously available.

Meteorological satellites are providing much additional information about the atmosphere. This is taking some, but not all, of the uncertainty out of making up the jigsaw that is the weather situation.

Indeed, satellites provide much of the information that comes from the vast oceanic regions which cover much of the Southern Hemisphere. This enables huge computers at the European Centre for Medium-range Weather Forecasts at Reading, near London, to predict with remarkable accuracy the broadscale wind patterns over the Southern Hemisphere up to five days ahead. This sort of ability appears almost magical. This is reminiscent of tribal days when early science appeared as a form of magic.

Hypnosis

How often have you listened to the forecast on the National Radio Programme — the one broadcast direct from the Weather Office — and heard the situation, the words 'Northland' and ''Auckland', and then drifted off only to 'come to' and hear the Chatham Islands forecast?

The fact that so many people don't hear the forecast for their area must mean that forecasters possess still another talent — that of mass hypnosis via radio! Many suggestions have been made over the years on ways to overcome this unintentioned effect. Maybe a trumpet blast, or a cannon round between districts. Perhaps the forecaster could change pitch now and then, announcing, 'Wake up in Wanganui, Manawatu and Wellington, here's your forecast'.

Mood music could be tried; it could make the interpretation easier and help people remember the forecast if bars of well-known tunes, descriptive of the forecast, were played at appropriate places. For instance, during a period of drought, farmers in particular could respond to 'Singing in the rain' when the forecast predicts steady rain; for variety 'Pennies from heaven' could be used. On the other hand, during a wet spell, a forecast of further rain could be heralded by 'Raindrops keep falling on my head'. Long settled spells would be implied by 'Shine on harvest moon'. And so on.

Sport and forecasting

Remember the Olympic Games? How we avidly watched the skills of the gymnasts, the speed of the athletes and canoeists. To us mere spectators there was the thrill of seeing people rise to a challenge.

Forecasters, I believe, are akin to these sportsmen and sportswomen. Every day they meet the challenge and enter a contest with the atmosphere: to try and beat the weather at its own game — to predict what is going to happen before it actually does.

Each day there is a new 'game' to play. There is no time to become dull and uninterested, for each game is new; there are no replays of the same situations.

Two years ago, our Past President, Dr John Maunder, delivered an address with the title: The Weather Game. He noted that many people play 'the weather forecast game'. Forecasters play this popular game all the time. They know that they can't possibly win all the time, but strive to do so most of the time. I believe that it is the challenge and the variety that is involved with the weather forecast game that lures them on, and keeps them at it for many enjoyable, though frustrating years.

551.509.58:629.12

Ship Damage and Loss
A case for the weather routeing of ships

By Dr R. Motte

Introduction

There would be no problem in precisely weather routeing a vessel across an ocean if it was possible to forecast with total accuracy the actual sea state existing for the duration of a voyage, making the assumption that the performance of that vessel throughout a range of sea conditions may be quantified. Such an ideal circumstance is not, as yet, possible. Depending upon the general synoptic situation existing for the period, it is fair to make the assumption that the actual accuracy of a weather forecast deteriorates as time progresses. This is, of course, in spite of the massive strides made in technology and considerable contribution in learning of the various forecasting agencies over the recent past decade. The new forecasting techniques of dynamical models, housed in massive computers, have made it possible to extend, with some confidence, the forecast period. Mariners may receive, on board, through the machinery of a standard marine facsimile device surface forecasts of sea state for forty-eight hours ahead and general lower atmosphere steering indicators for up to one week ahead of the analysis time. The latter give, in certain circumstances, an indication of the future movement of middle latitude depressions or cyclones[1].

The environmental information may be matched to ship performance data by using a microcomputer on board ship or, indeed, on shore. Dynamical programming techniques can then be used to generate optimum routes and a diagnosis of individual storms assist in voyage planning.

Ship damage and loss

A ship may be damaged or delayed by the action of sea waves on her hull, structure or cargo. Paradoxically, the recent rapid transfer of freight to the through transport mode of containerisation has highlighted this. The flimsy container (flimsy, that is, in comparison with the hull of a conventional freighter) often bears the brunt of a breaking sea with disastrous consequences. The relatively poorer sea keeping characteristics and higher potential speed of these vessels, allied to the requirement to maintain a schedule as part of a multi-modal system, may cause ship operators to take a harder look at the advantages a system of weather routeing has to offer. Much of the recent effort to reduce ship damage and loss by applications of technology has not been directed to loss due to environmental causes. Radar and navigational instrumentation are directed towards reducing collisions and modern inertial gas systems reduce the risk of explosion and fire in tankers. Little has been done in the application of new understandings and/or new technologies towards minimising the effects of stress of weather leading to damage or foundering and abandonment.

Reproduced from the *Nautical Magazine*, Vol. 235, No. 3, by kind permission of the Editor.

Table 1 indicates that some 0.3 of all ship losses are as a direct result of press of weather and this relates to approximately half a million tonnes of shipping each year. Consideration should be given in attempting to reduce this alarming statistic.

Table 1 — Vessel loss statistics

i) Totals (from all causes)
ii) Loss due to stress of weather, foundering and abandonment

	i LOSS		ii		
Year	Number of Vessels	Million Gross Tonnes	Number of Vessels	Million Gross Tonnes	Ratio ii/i
1978	170	1.4			
79	279	2.3	96	0.61	.34
80	227	1.8	88	0.42	.39
81	249	1.7	74	0.49	.30
82	236	1.46	62	0.40	.27
83	209	1.35	72	0.29	.22
84	215		86		.40

Not surprisingly the main areas of ship loss are in the middle latitudes of the North Atlantic and North Pacific Oceans. By far the greatest number of losses due to non-sustainable extremes of weather occur in these areas. Of course these are the densest trade routes but that is not the complete answer. It is, coincidentally, the home of middle latitude, extra tropical depressions, which sweep across this baroclinic zone. They dominate the weather in these areas, covering great areas of ocean with uninterrupted wind fields of long duration, which, in their turn, build up wide and fully developed sea states. On some routes as much as 30 per cent extra fuel is consumed, and an equivalent ratio of time added to voyage lengths, because of their effects[2]. They also cause damage to vessel and cargo. One North Atlantic operator has calculated an annual service cost of $800 000, as directly attributable to these storms[3]. The depressions travel in an approximately easterly or north-of-east direction at various speeds, which over the open ocean may be meaned to some thirty or forty knots. Vessels are most 'at risk' on westbound passages when they are closing these systems at a relative fifty or sixty knots (for a twenty-knot vessel). The consideration must be to minimise this system effect by judiciously planning a course through least wind and sea effects[4].

Modelling

The Meteorological services use world-wide data collection methods and the largest computers ever devised in a multi-million pound operation. Weather patterns are forecast for days ahead using complex and intricate, multi-layer, prognosis models. The numerical models now in use, for example in the British Meteorological Office, incorporate physical principles such as wave growth, interaction and dissipation, the advection of swell energy, refraction and friction. The basis of the model is a discrete directional wave energy spectrum (14 frequencies and 16 directions) which is determined by the surface wind fields forecast by the numerical weather prognosis model. Information on wave height and period can then be obtained by calculating the appropriate statistical moment of the energy spectrum[5]. The current ocean wave forecasts are run on the

huge CDC Cyber 205 computer, producing open forecasts up to forty-eight hours ahead for areas of the North Atlantic and North Pacific Ocean north of 18° N.

It is recognised by most seafarers that middle latitude cyclones are 'the enemy'. An attempt is made to understand the structure, development and future movement of each potential storm with a view to avoiding its ability to adversely affect a voyage.

Storm avoidance may be practised either by diagnostic modelling of each storm and/or by dynamical programming, whereby the criteria of time, fuel economy and cargo damage may be considered for optimisation procedures. The data input is as provided by the meteorological services through standard marine facsimile channels. The modelling relies entirely on this input.

REFERENCES

1. Motte, R. (1983). Ship-based weather routeing using dynamical meteorology. *Journal Royal Inst. of Navigation*, Vol. 36, No. 3, pp. 480–495.
2. Laurence, C.A. (1984). Vessel operating economies. Fairplay Publications, London, pp. 1–64.
3. Motte, R. and Laurence, C.A. (1985). Fuel Consumption in Container Ships on the North Atlantic. *Journal Royal Inst. of Navigation*, Vol. 38, No. 2, pp. 258–265.
4. Motte, R. (1985). Weather Routeing of Ships for the Northern Oceans. *Journal Royal Inst. of Navigation*, Vol. 38, No. 2, pp. 274–282.
5. Met. O. 962 (1984). Annual Report of the Meteorological Office, H.M.S.O., London.

AURORA NOTES JANUARY TO MARCH 1986

By R.J. Livesey

(Director of the Aurora Section, British Astronomical Association)

In Table 1 are listed observations of auroral activity which we have received to date from mariners for the period under review. In Table 2, we summarise the auroral activity as reported by land and marine observers, located principally in the North Atlantic Ocean, North America and north-west Europe.

Table 1 — Marine Aurora Observations January to March 1986

Date	Ship	Geographic Position	Time (GMT)	Forms in Sequence
6/7 Jan. ..	*Starella*	57° 09′N, 19° 20′W	2050–2350	HRmA, RmA, RmB, ¾ sky
7/8 ..	*Starella*	57° 00′N, 20° 00′W	0050–0350	RmB
18/19 ..	*Starella*	57° 02′N, 20° 00′W	0545	N
7/8 Feb. ..	*Cumulus*	57° 00′N, 20° 00′W	2240–0525	N, HA, N, pR_4R
8/9 ..	*Vigilant*	58° 20′N, 07° 30′W	0030–0055	amRR, SV
8/9 ..	*Londonbrook*	58° 00′N, 05° 30′E	1750–2127	RA, cp_2RA, pmHP, HA, RB, HP, p_2N
8/9 ..	*Gandara*	40° 08′S, 103° 34′E	1900–1940	G, mRR, p_3RR
8/9 ..	*Esso Demetia*	55° 50′N, 02° 50′E	2200–2249	G, qRR, RA
11/12 ..	*ACT 7*	50° 36′S, 99° 42′E	1630	RR, mRR, p_2mRB
12/13 ..	*ACT 7*	49° 40′S, 111° 08′E	1530–1550	HA, RR, RB, RA
22/23 ..	*Sekondi*	49° 00′N, 62° 42′W	0000–0230	HA, HB, HP, m_2RR
27/28 ..	*Esso Demetia*	59° 00′N, 02° 11′E	2153–2221	pRR
4/5 Mar. ..	*Fort Austin*	67° 41′N, 12° 05′E	2149–2208	RG, G, m_5RR, RB, HB
5/6 ..	*Fort Austin*	69° 22′N, 16° 19′E	1900–1945	B, RB, m_3HB, m_3HA, B, B
5/6 ..	*Cumulus*	56° 59′N, 20° 42′W	2110–2245	qN
6/7 ..	*Cumulus*	56° 58′N, 19° 56′W	2230–2345	qN, qN, m_3RR
25/26 ..	*Mairangi Bay*	48° 05′S, 108° 45′E	1415–1534	G, m_3HA, RA, aRB, m_3RR
29/30 ..	*Cumulus*	57° 11′N, 20° 19′W	0245	qN

KEY: a = active, c = corona, m = multiple, m_2, m_3, m_5 = 2, 3, or 5 forms, p = pulsating, p_2 = flickering, p_3 = horizontal streaming, q = quiet, A = arc, B = band, G = glow, HA = homogeneous arc, HR = homogeneous band, HP = homogeneous patch, N = aurora of specified form, R = rayed, RA = rayed arc, RB = rayed band, RR = rayed structure, S = surface, V = veil.

Mariners well know that the elements can catch them out if a good look out is not kept. With the approach of sunspot minimum and a general quietening of auroral activity, one could have been lulled into thinking that the fireworks were over until the beginning of the next sunspot cycle. There was an active aurora, all-sky in north Scotland on 6 January, and a quiet auroral arc in central Scotland on 21 January. All paled into insignificance when the magnetospheric storm at the beginning of February broke upon us. This turned out to be one of the biggest auroral events of the decade, and the best observed since your writer took over the observing network in 1976.

Scottish observers were under a cloud during the period, and the first indication of activity was disturbances of the magnetometers on the night of 6/7 February. On the following night of 7/8 February, magnetic activity was

much more intense, but on the night of 8/9 February, Owen Pearson in Edinburgh, and myself in Glasgow, measured a gross magnetic field deflection during the evening of over two degrees. The intensity of the magnetic activity was such as to be sure that aurora must be overhead.

Table 2 — Auroral Storms Reported January to March 1986 (excluding doubtful, isolated or high latitude observations).

Date (Night)	Location and Numbers of Observers	Geomagnetic Latitude Lowest	Highest	at Storm Peak	Maximum Storm Activity code*	Time (GMT)
3/4 Jan.	Mid Scotland (2)	59	59	59	2	1845–2300
6/7	Canada, U.S.A., U.K., Norway (9)	55	64	61	7	2000–0216
21/22	Mid Scotland (4)	59	59	59	2	1900–2358
7/8 Feb.	'Lima', U.K. (4)	58	64	63	5	1800–0600
8/9	Canada, U.K., Norway, New Zealand (38)	53	64	54	7	1540–0230
27/28	North Scotland (2)	61	61	61	5	2153–2342
28 Feb./1 Mar.	Alberta, North Scotland, Norway (5)	59	64	64	6	1900–2350
6/7 Mar.	'Lima', Scotland, North England (12)	56	63	58	6	1940–0380
7/8	Scotland, North England (3)	56	59	58	4	2000–2326

*Storm Activity Code: 1 = Glow or unspecified form, 2 = Homogeneous arc or band, 3 = Rayed arc or band, 4 = Ray bundles, 5 = Active storm, 6 = Coronal structures, 7 = All sky storm.

On the evening of 7/8 February, homogeneous arcs were reported from Canada, the weathership *Cumulus* and from Northern Ireland. On the night of 8/9 February however, active auroral rays and patches, sometimes beyond the zenith, were reported from Nottingham southwards and from Cornwall to Kent, right through the evening and into the small hours. As in Table 1, a number of ships reported the aurora, as did our observers in South Island New Zealand, Canada and Norway. Our most northerly observer, Dr Alastair Simmons, was on holiday in Spitzbergen to photograph the polar cap aurora, and saw the very active polarward activity of this storm as it spread northwards from the auroral zone. At the time, he did not know of the solar flares of the 3rd and 4th of February causing the magnetospheric storm.

Radio aurora events were reported on the 7th, 8th and 11th by a number of radio operators. There was a proton event peaking on the afternoon of the 7th, and a polar cap absorbtion event on the night of 7/8 February.

The London Weather Centre did us proud when John Kettley, on the BBC Television weather forecasts, mentioned the presence of aurora, thereby enabling a number of people in the south of England, who had never seen an aurora, or thought it possible to do so, to be able to observe this phenomenon. This boosted the number of casual reports that were sent in, thereby adding to the night's catch. The most comprehensive report on the storm came from Howard Miles in Cornwall, who tape recorded his observations which were then transcribed to give seven pages of minute-by-minute commentary on the performance of the storm, the variations of which could then be compared with the magnetic record.

A particular feature of this storm was the number of reports which referred to the white colour as well as greens and reds. As is well known, when red, blue and green colours are mixed together, a white colour is obtained. It is the blending of the different colour emissions from the various active atoms and molecules in the auroral process that cause it to look white. Faint aurorae, the brightness of which is below the threshold of colour vision, can also appear white or colourless, but in the case under discussion, clear white light was observed.

The active area on the sun continued to be excited for there was a repeat period of auroral activity in the magnetosphere in March, as will be seen from Table 2. Auroral rays were reported in England as far south as the Wirral on 6/7 March, and glows on the night of 7/8. This activity was triggered off by a disappearing filamental structure in the sun's atmosphere on 2 March. A proton event took place on 6 March due to a flare on the same date.

In layman's language, a solar flare event could be likened to a schoolboy's elastic catapult where the band is pulled taut and then suddenly released, the resulting output of energy being used to impart velocity to a stone. In the case of the sun, an arch of magnetic field lines that suddenly becomes unstable and rearranges itself, causes the violent movement of atomic particles to emit radiation while particles themselves are thrown out of the solar atmosphere. If these particles encounter the Earth, then auroral activity is generated. Solar flares tend to develop in the boundary regions of complicated magnetic fields of opposite sign, above or near to sunspots.

A filament in the solar atmosphere is a tube or loop of more concentrated material lying along the neutral axis between magnetic fields of opposite sign. When the fields reorganise themselves, and the filament which may have existed for some time, suddenly disappears, a similar slingshot effect as the solar flare can develop. A number of magnetic storms and auroral events in the past year or so have been attributed to disappearing filaments.

The weathership *Cumulus* and the meteorological offices at Wick, Kirkwall and Sumburgh airports, are presently forming a useful line of obsevers in the higher magnetic latitudes to monitor the quiet coronal-hole type of aurorae consisting of glows, homogeneous arcs and rays which are not seen down in the lower latitudes of central Scotland. This now forms a very useful group of observers, and their reports are gratefully received.

This report has concentrated very much upon the big February aurora as seen principally by landsmen. The decline in the numbers of merchant ships has been well noted over past years so that we are all the more grateful for all observations that do reach us. Once again, many thanks for your continued interest and co-operation.

LETTERS TO THE EDITOR

From Captain T.J. Sax, Master of m.v. *Oroya*, at the time of his retirement.

'I left school at the age of 14 and joined Prince Line in Leadenhall Street as an office boy, having already made up my mind to join the merchant navy. When I look back down the years, I can think of many people who assisted me in my career, but the two men who gave me my most important chance of all were Mr Collins, the man in charge of apprentices, and Captain Cameron, the Principal of Sir John Cass Nautical College. They succeeded in ensuring I passed the exams which gave me an apprenticeship in the Prince Line fleet.

'World War II had ceased before my first voyage to sea but I did serve in ships which traded in various parts of the world, in times that were anything but peaceful. My experience of sailing through the eye of a typhoon in the South China Sea may be of interest to readers.

'I was 4th Officer of m.v. *Cingalese Prince* at the time, commanded by Captain J.D. Fraser. We had just completed a tour of duty as a government supply ship, having loaded a military cargo in Barry, South Wales, for Pusan during the Korean war in 1950. It was, in fact, the vessel's maiden voyage. On completion of discharge at Pusan the vessel was handed back to Prince Line, the captain having received orders to proceed to Hong Kong to commence loading on the Line's round-the-world Far East service.

'On Tuesday, 7 November 1970, the ship was south of Formosa (now Taiwan). I was on watch with the Chief Officer, Mr Jennings, when we noted that there was a slight fall in the barometer and that the pattern of diurnal range was not as regular as on the previous day. By Wednesday evening I think we all knew that something was amiss. Captain Fraser had received a Typhoon Warning and the crew were employed in securing the vessel, against storm conditions. I remember clearly looking at the sky and noting the amazing copper-coloured hue, the long, heavy, oily swell and the lines of cirrus cloud; the fingers of the storm converging on the horizon. Captain Fraser read the signs and took evasive action, turning away from the storm. I know now that his action was correct, but unfortunately the typhoon was moving very fast and apparently took a round turn out of itself and the net result was that on 9/10 November the centre of the storm passed right over our position. Over the years I have sailed through many severe storms, but never one as severe as the centre of typhoon 'Clara'. The seas were truly mountainous and the noise of 120 knot winds unbelievable but we survived. At first the ship was thought to have suffered only superficial damage, but some months later it was discovered that the engine bed plate was fractured, which necessitated a three month stay in the Sun dockyard in Chester, Pennsylvania. Captain Fraser sustained severe bruising and lacerations and on our arrival in Hong Kong he was hospitalised for observation.

'The Chief Officer took temporary command for the short run to Singapore and about 2 weeks later the Captain rejoined the vessel, fully recovered from his injuries.'

Personalities

(Readers are invited to notify the Editor of observing officers retiring from the Navigating and Radio departments.)

RETIREMENT — CAPTAIN J. SAX recently retired from the sea after forty years of service aboard ships of companies associated with the Furness Group.

Theodore James Sax was born at Walthamstow, Essex, in 1930, and after local schooling, underwent pre-sea training at Sir John Cass Nautical College in east London. He joined the Prince Line and first went to sea on 13 September 1946, sailing from Canada Dock, Liverpool, on m.v. *Malayan Prince.*

Captain Sax remained with the Furness Group until his retirement on 24 July 1986: he says that he sailed in ships of all their different companies, including Prince Line, Royal Mail, Pacific Steam Navigation Co. and Shaw Savill, but he has always considered himself a Prince Line officer at heart. He passed his Master's examination on 9 December 1957 and was promoted to command in August 1973, the ship involved being the tanker *William Wheelwright.*

He sent the Met. Office a total of 25 meteorological logbooks during his career, the first of which came from the *Cingalese Prince*, and was assessed as 'Excellent' in February 1951.

Captain Sax has provided us with some reminiscences of his sea career, which appear under the heading of 'Letters to the Editor' on page 00. For this material we send thanks and good wishes for a happy and successful retirement.

RETIREMENT — CAPTAIN B. BOWTELL commenced retirement on 1 July 1986 after many years at sea with City Line and Shell.

Brian Bowtell was born in March 1931 and completed 4 years training at the Graham Sea Training School, Scarborough, in 1947. In July of that year, he joined his first ship with Ellerman and Bucknall Steamship Company Ltd, s.s. *City of Rochester.*

Some years later, he left Ellermans and signed on with Anglo-Saxon Petroleum Company Ltd — later Shell Tankers (U.K.) Ltd — and it was from that company's ship *Latia* that we received the first of 37 meteorological logbooks compiled by Captain Bowtell, in July 1955. His Master's Certificate was gained in July 1958, and his first command was s.s. *Halia* on 30 December 1969.

The Met. Office continues to be grateful for consistent weather observing co-operation over the years, and for his part, Captain Bowtell submitted 16 logs which were assessed as 'Excellent' and he received an Excellent Award in 1981. We offer our sincere thanks for his contribution and for his good wishes sent to all our staff, particularly to the Port Meteorological Officers whose motivation was largely responsible for his application to regular weather watching.

J.F.T.H.

Book Reviews

Ocean ships by David Hornsby. 150 mm × 220 mm, 288 pp., *illus.* Ian Allan Ltd., Coombelands House, Addlestone, Weybridge, Surrey KT15 1HY. Price: £9.95.

First produced in 1964, the 1986 edition of this compact book reputedly shows less than half the vessels included in the previous edition, that of 1982, indicating a period of rapid change and rationalisation for shipowners, and a need for this edition.

The book is divided into two parts, the first dealing with passenger liners and cruise ships, the second with cargo vessels and tankers. An alternative in format compared to previous editions is the combining of dry cargo and tanker vessels into a single section, partly brought about by the severe contraction in world tanker fleets. Wherever possible, all ships over 5000 G.R.T. are listed, any major exceptions being covered by footnotes.

The ships are catalogued in alphabetical order by name of company on left hand pages with the right hand pages being taken up with photographs in black-and-white of selected ships from some of the companies listed. All relevant ships of each company are entered with date of build, G.R.T., length overall and extreme breadth in metres, service speed, type of engine, number of screws and former names. The country of ownership is also given after the company's name.

The passenger ships section is probably the one appealing to all tastes, showing all the famous, and the less well-known, liners of the day, with good quality accompanying photographs of most of them. It is surprising how many well-known ships of another age are still sailing the high seas under alternative names.

This book is considered very good value as a ready reference for ardent ship spotters, as it is also provided with a full ship name index and addenda bringing the contents up to date.

J.F.T.H.

JANET: The Restoration of a Victorian Yacht by Jonathan Watson. 140 mm × 220 mm, 142 pp., *illus.* David & Charles, Brunel House, Newton Abbot, Devon TQ12 2DW. Price: £10.95.

J.A. Watson has set out to chronicle his successful restoration to fine sailing trim of the wreck of a Victorian yacht found abandoned on the east coast of England. This he succeeds to do with much charm and in great detail, but never in boring fashion, as the love of his work and his re-creation comes through with every chapter.

He tells of how he found the *Janet*, a sad hulk left to die on Canvey Island, in 1978, some 79 years after she had been built as the *Twll Du* by William Roberts of Chester. The narrative describes how the work of restoration was done, using mainly traditional tools, during periods of leave from the well-known ferry company for which he worked. All the details of reconstruction, rigging, the difficulties encountered and the solving of problems are included in this fascinating account of one man's determination to rejuvenate an elegant lady fallen on hard times.

Jonathan Watson includes an excellent glossary of terms used in boat building as well as Survey Notes, Hull Scantlings, Rigging Details and Tools Used in four appendices. The 12-ft boat was built as a Morecambe Bay Prawner with single mast and spanker, topsail and two jibs as her sail outfit; during the renovations, the mast was stepped 12 inches forward of the usual position to allow more cabin

space and ease the tendency those vessels have for weather-helm. The remainder of the work was intended to retain the boat's original Victorian character and this was clearly the author's prime purpose — to restore the craft as near to her former appearance using traditional implements as much as possible.

The many diagrams and photographs amply illustrate the progress of the project from first sight of the hulk to finished yacht under sail. The book is both an absorbing story and the complete reference work on small boat restoration.

J.F.T.H.

Aurora, the Northern Lights in Mythology, History and Science by Harald Falck-Ytter. 215 mm × 237 mm, 167 pp., *illus.* Floris Books, 21 Napier Road, Edinburgh EH10 5AZ. Price: £18.50.

Polar explorers tried to describe in words, on their return to their fellow countrymen, the sights of an auroral display, perhaps not appreciating that to the inhabitants of the far northern regions they visited, such an occurrence was not unusual, though held in high regard nevertheless, as a manifestation of the spiritual or supernatural energies of their respective cultures.

When news and accounts of the aurora reached Europe, attempts were made to explain it scientifically, but the level of thought at the time could not cope with a phenomenon which appeared to have no set pattern of behaviour or occurrence, and which contained such a fantastic diversity of luminosity, colour and form. During the nineteenth century, researchers began to see a connection between the sun and the aurora, but it was not until 1879 that the link was fully established by Sophus Tromholt, a Dane who spent a quarter of a century in Scandinavia setting up observatories and collating thousands of reports from over a hundred locations. It was he who finally identified the existence of the auroral ring or oval, which, it is now clear gives rise to the various auroral forms, depending on the view point of the observer. Following Tromholt's work, scientific research into all aspects of the aurora progressed over the years, to the point where today, satellites can photograph the auroral oval from above, while spectral analysis techniques can identify the component gases in a display taking place at least 55 miles above the Earth.

All this is a far cry from the myths and legends of the far north, surrounding the aurora, telling of ball games played by souls of the departed, or of gods communicating with mankind or of spirits lighting the way for new arrivals.

Such are the contrasts within this interesting book; in eight chapters, the reader is taken from the myths of the unexplained, to facts about what are, perhaps, the most spectacular light shows ever concocted by Nature. Throughout, there are illustrations of various auroral forms, ranging from a reproduction of a 1745 figure in black and white, to stunning full-page recent colour photographs (24 pictures in all), and the latter will certainly whet the appetite of the as yet uninitiated aurora observer, although it is presumably these same pages which have contributed to the cost of the book.

Some degree of deeper thought is called for from time to time, as the author often delves into the abstract, spiritual aspects of man's relationship with his environment and with atmospheric phenomenon such as lightning, rainbows and of course, the aurora, all three being regarded as 'metamorphoses of sunlight', but as the book's sub-title suggests, it is not an account of the aurora solely in terms of 'how' and 'why'.

J.M.

Storm by A.B.C. Whipple and the Editors of Time-Life Books. 235 mm × 285 mm, 176 pp., *illus*. Time-Life Books Inc., U.S.A. Price: £12.50.

This book is one of many in the series 'Planet Earth' and is of the excellent quality we have come to expect from these respected publishers. In 6 chapters and 7 essays, theory and practical experience, both ancient and modern, are dealt with in a style that is simultaneously interesting, educative and easy to understand.

The accounts of particular storms are mainly confined to the United States, but there is also much historic detail from all parts of the globe as well as clear descriptions of weather and its origins. The whole is well augmented by many remarkable photographs and drawings. Included is the tale of the great Galveston gale in 1900, caused by a hurricane which wrought such havoc as to be described as the worst storm disaster in American history. About 6000 people perished as a result of that storm, 5000 were injured and more than 2600 homes destroyed, resulting in 10 000 survivors homeless. From more recent times, one of the essays describes 'The blizzard that buried Buffalo' during the great snowstorms of the severe winter of 1976/77 that affected much of New York state and when the Niagara Falls almost iced over.

Meteorological calamities through the ages are catalogued in various chapters, together with details of the many myths and beliefs, not all ancient, that have pervaded, all well supported with contemporary artwork of high quality.

There are also chapters about thunderstorms, hailstorms, lightning and tornadoes, including such aspects as research and discovery of the workings of the earth's atmosphere and how man's defences against the ravages of the weather are being improved: there are many well produced 3-dimensional diagrams included to illustrate these points.

Admiral Sir Francis Beaufort is remembered for his wind scale and weather notation system, still in use almost unchanged since he originated them about 1800 but which were not accepted by the hidebound Royal Navy for more than 30 years. The final section of this fascinating book deals with man's attempts to tame the elements, as with cloud seeding experiments, storm watching from space by satellite and inspection of storm clouds by teams of high-performance aircraft. There is an extensive bibliography and adequate index to complete a book about storms worthy of most people's bookshelves.

J.F.T.H.

Notice to Marine Observers

COLOUR PHOTOGRAPHS REQUESTED FOR PUBLICATION

With the advent of our first illustrated front cover for *The Marine Observer*, we are seeking to borrow more good quality photographs taken by anyone sailing on observing ships, in order to feature a new picture on the front of each successive edition.

Subjects under consideration include any type of meteorological feature, sea or sky views and the whole range of natural life encountered at sea.

Colour transparencies are favoured by the printers, although suitable prints can be accepted, and any material loaned for this purpose will be returned to contributors if requested. Due acknowledgement will of course be made on behalf of those whose work is published.

Fleet Lists

GREAT BRITAIN

Corrections to the list published in the July 1986 edition of *The Marine Observer*. Information regarding these corrections is required by 30 September each year. Information for the July lists is required by 31 March each year.

Name of Vessel	Date of Recruitment	Master	Observing Officers	Senior Radio Officer	Owner/Manager
Asiji	30.6.86	D. Tyler	K.E. Hammerman, R.P. Williams		Maersk Co. Ltd
Atlantic Amity	26.3.86	J. Bruce	S. Hennessy, J. Gibbs, R. Glover	–. Bruggen	Furness Withy (Shipping) Ltd
Barbara E	10.6.86	A.P. Maytham	M.N. Beeley, M. Tyler		Maersk Co. Ltd
Barber Hector	18.4.86	C.M. Sandy	B.N. Jones, M. Sinclair, G.C.R. Griffiths	P.A. Gooch	Ocean Fleets Ltd
Blue Excelsior	13.2.86	R.G. Stollery	P. Edwards, S. Chapman, N. Danning	P.J. Rowe	Ajax Marine Ltd
British Norness	6.4.86	K.G.E. Lawrance	J. Rashleigh, F. Wilkinson, T.C. Moore	N.P. Hill-Heaton	B.P. Shipping Ltd
Cable Protector	8.5.86	E. Turner	P. Hare		Cable & Wireless PLC
Celtic Challenger	1.5.86	M.R. Gadd	J. Aynsley		C. Willie (Shipping) Ltd
Challenger	21.8.86	P. Maw	D.W. McAlpine, B.M. Richardson, R.F. Hagley		Natural Environment Research Council
Dawpool	14.7.86	T.J. Proctor			Dawpool Shipping & Trading Ltd
Discovery	12.3.86	P. Warne	P. Oldfield, –. Evans, D. Coverdale, S. Mayl		Natural Environment Research Council
Endeavour	21.3.86	T. Robinson	N. Riley, R. Purser, A. Morley	A. Critchley	Souter Shipping Ltd
England	–.8.86				Cunard Shipping Services Ltd
G.A. Reay	18.7.86	A.W. Barkworth	G. Petty, F. Wilson	A. Fulcher	J. Marr & Son Ltd
Geestcape	20.8.86	G. de F. Foster	M.F. Tibbles, C. Flanagan, A. Ward	R. Byng	Geest Line Ltd
Geesthaven	2.9.86	G. McDonald	K.B. Henry, D. Buckingham, R.J. Hawkins	M.I. McGregor	Geest Line Ltd
Glenavon	15.8.86	A. Phillips	P. Hackwell, M. Windows, B. Bradfield, R. Bragg		Wessex Water Co.
Graiglas	15.3.86	R. Wade	R. McDonald, R.G. Tanner, R. Hulme	S. Potter	Garth Shipping Co. Ltd
Highland Reel	27.3.86	I. Revie	D.J. Cowie, D.M. McIntyre, H. Miller		Ugland Marine Ltd
Iberita	15.5.86	J.A. Attwater	S. Deshpande, E.C. Reuben, D.K. Malhotra	S. Deshpande	Ugland Marine Ltd

Jasmine B	19.3.86	R.B. Stephens	S.P. White, P. Shute, C.J. Shill	W. Sterling	Beta Marine Services Ltd
Memnon	–.4.86				Ocean Fleets Ltd
Nassau Pride	–.4.86	J.A. Coffin	W.O. Garner, C. Berkley, M. Gover	A. Cheshire	Garth Shipping Co. Ltd
Oceanhaven	23.6.86	E. Finch	S. Kumar, P. Chawla, D. Mukherjee	S. Basseen	Bluehaven Shipping Ltd
Ormond	19.9.86				P. & O. Lines Ltd
Regina Oldendorff	28.8.86	M.S. Nair	J. Reed, V. D'Cunha, T. Ramzil	M.S. Dosanjh	Egon Oldendorff (Hong Kong) Ltd
Repulse Bay	23.5.86	R.K. Shrivastava	N. Hardi, A. Mehra, R.S. Anand	D.J. Pinto	Ocean Transportation S.A.
Researcher	31.7.86	H. Monckton	R. Grey, M. Pountain		Gardline Shipping Ltd
Sea Searcher	4.6.86	J.N. Woolley	A. Rawlinson, T. Childs		Gardline Shipping Ltd
Sonia M	2.4.86	J. Birrell	G. Sifuentes, P. Gallie, J. Moore	I. Conn	Cardiff Ship Management & Services Ltd
Starella	1.5.86	J. Cannan	J. Davis, J. Burns		J. Marr & Son Ltd
Stellaman	21.5.86	S.A. Scott	P.J. Wilkinson, R. Tyler		Rowbotham Tankerships Ltd
Stena Seawell	14.8.86	M. Williams			Stena Ltd
Strathconon	19.6.86	K.J. Owen	M. Baraclough, N.M.V. Salmon, S.D. Smith	D. Millar	Overseas Containers Ltd
Swift Trader	25.9.86	S. Pollock	R. Pemberton, R. Smith		International Chartering PLC
Tula	8.8.86	R.E. Baker	V.M. Aguilar, A.A. Field, S.F. Broderick	J.H. Kell	Cardiff Ship Management & Services Ltd
Viking Venturer	16.6.86	R.H. Plant		P. Morris	Townsend Car Ferries Ltd
Viking Viscount	13.6.86	M. Edwards	P. Goode, P. Meyerhoff	J. Taylor	Townsend Car Ferries Ltd
West Moor	27.5.86	G. Pennel	C.A. Campbell		Denholm Ship Management Ltd

The following Selected Ships have been deleted:

Benedict, Boniface, Cairnsmore, Capricorn, Celtic Endeavour, Crestbank, Dryso, Esso Humber, Gardline Tracker, Geestland, Geeststar, Lincolnbrook, Lloyd Australia, Londonbrook, Malayan Reefer, Mexican Reefer, Pacific Challenge, Pacific Courage, Pacific Patriot, Pacific Peace, Pegasus, Pollenger, Port Quebec, Scottish Eagle, Sekondi, Serenity, Sokoto, Toki Arrow, Troll Maple, Troll Viking, Vendee, Venturous, Viking Trader, Vosges, Wilmington, Yaqui.

BRITISH COMMONWEALTH

AUSTRALIA (Information dated 18.8.86)

The following Selected Ships have been recruited since the list published in the July 1986 edition of *The Marine Observer.*

Franklin, Iron Curtis, Iron Kembla, Iron Monarch, Iron Newcastle, Iron Pacific, Jabiru Venture, Klang Reefer, Mangrove Creek, Swan Reefer, Swordfish.

The following ships have been deleted:

Anna Bakke, Barber Taif, Eugene McDermott II, Icebird, Lysaght Endeavour, Oriana, Orv Franklin, Ragna Bakke, Riquita, Seaway Melbourne.

NEW ZEALAND (Information dated 1.7.86)

The following ships have been recruited since the list published in the July 1986 edition.

Canterbury Express, Capitaine Cook III, Cormorant Arrow, Union Endeavour.

The following ship has been deleted:

Union Sydney.

The following Supplementary Ship has been deleted:

Ile de Lumiere.

The following Supplementary Ship has been recruited:

Seaway Sandpiper.

Corrections

The following Supplementary Ships were omitted from the July list:

Arahanga, Arahura, Aratika.

Printed in the UK for HMSO. 0739132.C18.1.87.50551

HMSO publications are available from:

HMSO Publications Centre
(Mail and telephone orders only)
PO Box 276, London, SW8 5DT
Telephone orders 01-622 3316
General enquiries 01-211 5656
(queuing system in operation for both numbers)

HMSO Bookshops
49 High Holborn, London, WC1V 6HB 01-211 5656 (Counter service only)
258 Broad Street, Birmingham, B1 2HE 021-643 3757
Southey House, 33 Wine Street, Bristol, BS1 2BQ (0272) 24306/24307
9-21 Princess Street, Manchester, M60 8AS 061-834 7201
80 Chichester Street, Belfast, BT1 4JY (0232) 238451
13a Castle Street, Edinburgh, EH2 3AR 031-225 6333

HMSO's Accredited Agents
(see Yellow Pages)

and through good booksellers

© Crown Copyright 1987
First published 1987

Annual subscription
£10·30 including postage.

£2·60 net

ISBN 0 11 727919 6
ISSN 0025–3251